Re-City. (Im)possible cities

RE-CITY

(IM)POSSIBLE CITIES

Juho Rajaniemi & Minna Chudoba (editors)

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ISSUE EDITORS
Minna Chudoba
Juho Rajaniemi

SERIES EDITORS
Gareth Griffiths
Minna Chudoba

LAYOUT AND COVER DESIGN
Sandra Kangaspeska

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In memory of Professor Necdet Teymur (1945 – 2017),
a long-time member of the DATUTOP editorial board

INTRODUCTION

The second international city regeneration congress, Re-City 2017, took place on 24. – 25.8.2017, two years after the first congress. As previously, the conference was a collaboration between University of Tampere and Tampere University of Technology. This time, about 65 researchers from about 20 different countries gathered in Tampere, Finland, to discuss the challenges of envisioning, planning and constructing today's cities. The conference theme *(Im)Possible* cities was shared by another conference organised in Tampere during the same week, by the Association of Literary Urban Studies (ALUS). In addition to sharing the theme, the two conferences shared one seminar day, allowing researchers of literary studies, architecture and urban studies to intermingle and share views on the urban condition and its visionary future. Indeed, the imagination-provoking theme resulted in a variety of papers, ranging from literature-inspired theoretical studies to practice-oriented reports of urban management and urban planning.

The call had been for both good and bad examples of city regeneration. The tracks had been colour-coded as follows:

Black: Dystopic features, urban conflicts, pollution.
Blue: Water-related issues.
Brown: Brownfields and industrial buildings, decay and patina, temporary uses.
Green: Green spaces, health and ecological issues.
Rainbow: Gender, minority and mixed use issues.

The conference organisers received a total of 60 abstracts. The scientific committee consisted of 16 peer reviewers of different scientific backgrounds, who accepted 37 papers to be presented at the conference. All the colour-coded tracks gathered a diverse collection of topical presentations, which provoked lively discussions during the seminar. The multi-disciplinarity of the conference was naturally apparent in these discussions. A variety of viewpoints were provided to numerous contemporary urban issues. Many urban scales were handled in the presentations, from the growth of peripheral settlements and urban mobility to issues of water management in the era of climate change.

The invited keynote speakers reflected the multi-disciplinarity of the congress as well. Lucy Bullivant (PhD Hon. FRIBA) had titled her lecture *Remaking Urban Places – the Art of the Impossible?*, giving the congress audience a look at successful examples of participatory placemaking around the world. The inspiring cases had encouraged local initiatives and resulted in new socially geared urbanistic activities. However, gentrification was seen as a possible problem in placemaking. Professor Laura Kolbe from University of Helsinki brought forth the meaning of tradition in the urban context. Cities were described as identity platforms, and the factors creating an urban essence were explored. These ranged from a sense of community to a sense of openness and universal cosmopolitanism. Professor Panu Lehtovuori from Tampere University of Technology asked *How Dense is Urban?*, questioning the validity of various urbanity indexes. Professor Marketta Kyttä from Aalto University gave the congress audience a glimpse *Towards Urban Happiness.* Peoples' perceptions on urban happiness had recently been studied in Helsinki. One of the research interests was the correlation between urban density and perceived environmental quality. This correlation was found not to be linear, and density was perceived differently in the centre and the suburbs. The last keynote speaker, Professor David Pinder from Roskilde University, was looking both backward and forward with his lecture *Through the Future's Ruins: Utopia and Reclaiming the Urban (Im) possible.* Dystopia and utopia were juxtaposed in a collage of images from literature as well as the screen, but the lecturer ended on a positive note with a quote from Lefebvre: "We are all utopians".

The scientific committee of the congress has chosen for publication in this issue of DATUTOP some of the most topical subjects presented at the congress. The criteria used in the selection included novelty, clarity, scientific value, overall quality, international appeal, relevance to the conference theme and links to the other chosen papers. This meant that many fine papers of interesting topics had to be left out of this publication.

The selected papers do not cover all the tracks. Nevertheless, they provide a descriptive cross-section of the congress presentations. The topics deal with issues that are current in cities around the world: administrative challenges, densification and growth, urban mobility, water management, recreation and health. The diversity of the papers reflects the imaginative aspect of the conference theme, although the papers tend to lean towards the possible instead of the impossible. The latter is probably best seen in the vastness of the explorative literary landscape of the last paper included in this collection. In the end, seven articles were chosen to be published under three different sections.

Section one, *Parks and water as elements in urban regeneration,* deals with issues brought about by climate change: rising sea levels affecting coastal cities and urban storm water management. The first case is from Norfolk, a city on the Eastern coast of the United States, the second is from the capital of Finland, Helsinki. Section two, *Settlements, mobility and regeneration strategies,* offers a look at challenging cases of urban development around the world, in various scales. Questions of decentralisation, densification and the management of urban growth are studied with examples from Jordan, Iran, Chile and Ecuador. This section brings forth both large-scale urban management issues as well as the importance of small-scale interventions that shape people's everyday lives. Section three, *Poetry and urban regeneration discourse*, links the Re-City conference's urban studies focus with the ALUS conference's literary focus. The South American poet presented in the last paper has a global viewpoint, and is able to traverse from one continent to another within adjoining lines of one poem. The poetry seems to simultaneously transcend time as well as place.

SECTION ONE: Parks and water as elements in urban regeneration

Phoebe Crisman's article on urban wetland parks combines sea level rise management with coastal ecosystem restoration. At the same time, issues of urban recreation, health and well-being are addressed. The case is specific, but parkland areas amid post-industrial urban landscapes exist in other areas around the world. In addition to recreation, these areas have possibilities in the absorption of storm surge waters. Research on the specific case presented in this paper is still ongoing, but already findings point to positive reactions and possible health benefits generated by an interactive park landscape.

The issue of storm water management is current in many cities, especially relevant in the changing conditions brought about by climate change. Elisa Lähde and Kajsa Rosqvist have studied the development of sustainable storm water management in one particular Finnish city, Helsinki. Their study uncovers several barriers in this process, lack of knowledge and unclear roles among the operators being the most prominent. According to the writers, existing planning procedures need to be examined critically, if the city is to truly become a water-sensitive city in the future.

SECTION TWO: Settlements, mobility and regeneration strategies

In her paper, Alia'a Amr offers a view over the Middle Eastern decentralisation discourse especially around Sahab, one of the satellite towns of Amman City, Jordan. The growth of the population in Sahab, as well as in the whole area, has been very fast, and its consequences very severe and visible. Therefore, managing the growth has been and still is a highly important issue in the area. Nonetheless, as Amr points out, the two-tier administration system in Amman has been incapable of achieving urban goals. This has caused, among other things, a sprawl of settlements lacking urban form and spatial identity. Fortunately, Amr also presents five proposals for a more successful urban decentralisation.

Urban mobility cannot be extracted from urban regeneration. Quite the contrary, how we move in our cities is crucial, not only to city structure, but also to our well-being, social inclusion and the quality of life. Cities' public transport systems are planned to provide decent possibilities for moving within cities and their regions. However, they cannot reach all urban areas at all times. Marcela Soto and Jorge León show how this leaves room for more private transport innovations. They compare formal (or semi-formal) and informal urban transport solutions in Valparaíso, Chile. Their study demonstrates how public transport and collective taxis are completing, competing and evolving with each other.

Elnaz Naseri and Behrouz Safari are applying chaos theory to their evaluation of neighbourhood renovation in Tehran. The unsuccessful outcome of the renovation is here linked to a disregard of the urban phenomena inherent in the implementation of the plan. As a result, the spatial–physical has been prioritised at the expense of the social, and mistrust in governmental and municipal agencies has intensified. With its theoretical basis, the paper proposes a way for planners to see the possible structural causes of failure, thus helping to understand the chaos-generating factors in a plan's implementation.

Antonio di Campli brings up particular problems in Latin American cities, especially in the densification of medium-sized cities in Ecuador. His case study is about Loja, a city of 200 000 inhabitants situated in an Andean valley, about 2 100 meters above the sea level. Through spatial surveys, interviews and socio-economic inquiries, he crystallises three central elements for the urban densification: habitability of urban space, reductions in social fragmentation and enhanced spatial equality. They are all needed in a fight with the rootlessness of urban settlements and with the planning techniques uncritically borrowed from Europe and North America.

SECTION THREE: Poetry and urban regeneration discourse

Maxwell Woods' paper bears a strong link to the ALUS conference, acting as a hinge between literary and urban studies. It explores literature's possibilities in depicting ideas and concepts, which could either be translated to urban visions, or used metaphorically to better understand urban reality in the modern world. A reading of the poet Vicente Huidobro's take on planetary urbanisation and a new global spatial order aims at reconceptualising the programme of environmental urban design. The author presents here a poetic landscape, which could be used as a framework in discussions of urban regeneration.

This collection of Re-City 2017 congress papers is published as DATUTOP series number 35. The DATUTOP journal (Department of Architecture Tampere University of Technology Occasional Papers) has been published since 1982, making the congress year of 2017 the 35th year in the journal's history. Even though the name of the department (currently called School of Architecture in the Faculty of Business and Built Environment) has changed, the journal has kept its original name. With the current issue, the editors also wish to commemorate Professor Necdet Teymur, who served as a member of the DATUTOP editorial board for many years.

Minna Chudoba
University lecturer
DATUTOP series editor
Tampere University of Technology

Juho Rajaniemi
Professor of Urban Planning
President of the Re-City 2017 Congress
Tampere University of Technology

SECTION ONE
PARKS AND WATER AS ELEMENTS IN URBAN REGENERATION

Urban Wetland Parks: Strategies for Improving Human Health & Well-Being

Phoebe Crisman

ABSTRACT

With increasing concern for the negative effects of climate change and sea level rise on human health and well-being, urban wetland parks offer a viable alternative to traditional, manicured parks prevalent in cities around the world. Such parks can combine the benefits of a typical waterfront promenade with coastal ecosystem restoration and sea level rise (SLR) management. Yet SLR mitigation efforts are commonly seen as purely engineering and economic problems to be solved. Benefits to human health and well-being, such as recreation, environmental education, and stewardship opportunities, are often marginalized in the planning process. The renewal and regenerative capacity of urban ecological systems should not be overlooked. Even though a growing body of research measures how short-term activity in parks and other green urban environments can improve human health and well-being, few coastal restoration and resilience projects directly consider evidence-based connections between public health and the constructed environment.

This is especially important since urban adaptation solutions often include massive concrete walls or earthen levees that disconnect residents from the water and damage coastal habitat. By simultaneously considering the intertwined value of urban parks, wetland restoration, and SLR mitigation, coastal cities can achieve synergistic solutions to all three challenges. Hence, urban wetland parks are a particularly viable strategy.

This paper includes a focused case study of the Paradise Creek Nature Park in Norfolk, Virginia—one of the cities most threatened by sea level rise in the United States. This recently completed, 40-acre constructed wetland park is located amidst contaminated industrial sites and an economically challenged and racially diverse urban neighborhood. The Park project empowered an urban community in need, while designing, implementing, and testing translatable strategies for creating healthy, public landscapes. The necessity of integrating resilient coastal design strategies and public health and advocacy policies is escalating as sea levels rise.

Keywords: urban parks, constructed wetlands, industrial landscape, sea level rise adaptation, coastal restoration

Figure 1: Aerial View of the Elizabeth River and the Paradise Creek Nature Park (center left)

1. INTRODUCTION

Urban wetland parks that combine coastal ecosystem restoration and sea level rise management with public waterfront access and recreation are an excellent alternative to traditional waterfront parks and promenades. When designed in a holistic way, these parks can simultaneously combat the negative effects of climate change and SLR while offering recreational, educational, and stewardship opportunities that increase human health and well-being. Given these synergistic benefits, why is SLR mitigation planning often treated as an engineering and economic problem that overlooks the regenerative capacity of urban ecological systems and vital societal considerations? For instance, tall concrete walls and earthen berms that destroy coastal habitat and separate residents from the water are a common urban adaptation strategy. Few coastal restoration and resilience projects directly consider evidence-based research that measures how short-term activity in parks and other green urban environments can improve human health and well-being. This paper examines the 40-acre Paradise Creek Nature Park as a successful example of an effective, community-engaged process for urban wetland park design and implementation. Using a design research method, a University of Virginia research team created designs for the Park

and its sustainable and interactive architecture in collaboration with the City of Portsmouth Department of Parks & Recreation, Portsmouth Public Schools, the Elizabeth River Project, and Crisman+Petrus Architects. Located in Southeast Virginia, the region most threatened by sea level rise in the United States, the park is situated adjacent to an economically disadvantaged and racially diverse urban neighborhood and within a toxic industrial landscape. The case study demonstrates how the Paradise Creek Nature Park project empowered an urban community in need, while designing, implementing, and testing translatable strategies for creating an urban wetland park that promotes human health and well-being. Finally, the paper offers a relevant perspective on urban wetland parks for both researchers and practitioners in the field of urban planning. The necessity of integrating resilient coastal design strategies and public health and advocacy policies is escalating as sea levels rise.

Figure 2: View of wetland under construction and current condition

2. WHY WETLAND PARKS

While the human benefits of urban parks in general are well documented, this paper argues specifically for the value of urban wetland parks. Wetlands are shallow, water-covered liminal lands between terrestrial and aquatic systems (Cowardin et al. 1979, 3). Both saltwater and brackish tidal wetland ecosystems are encountered when designing for coastal sea level rise adaptation. Because the USA and many other countries have adopted a 'no net loss' wetlands policy and signed the Ramsar Convention treaty, restored wetlands are a particularly viable regeneration strategy supported by robust public policies. Humans have a long and complex history of thinking about wetlands in different ways—as providing valued ecosystem services, as threatening to human health, or as useless and undervalued land. In *Wetlands and Human Health*, the editors frame the collection of essays within a "human-wetland nexus"

(Finlayson et al. 2015). In the essay "Wetlands and Health: How do Urban Wetlands Contribute to Community Well-being?" May Carter identifies three benefits of wetlands beyond ecosystem considerations: creating "places of recreation and social activity; engendering a sense of place and cultural connection; and engaging people in conservation activities" (Carter 2015, 155). Each of these was an important design goal of the Paradise Creek Nature Park. For instance, the introduction of glass bottom kayaks at the Park has become a major attraction that engages a broad range of local residents. While the personal satisfaction achieved through water-based recreation is well documented (Curtis 2003), this type of outdoor activity is often considered undesirable in a compromised industrial landscape. Yet park visitors clearly take great pleasure in their experience kayaking on the water amidst concrete storage silos and landfills.

There is a growing body of both qualitative and quantitative research on the diverse benefits of urban wetland parks as productive ecosystems (Austin & Yu 2016). For instance, there are several studies of Shanghai's Houtan Park, which is an excellent example of a wetland park within a post-industrial urban landscape. In the context of this research, however, the link between the health of human systems and ecosystems is crucial, including the mitigation of non-point source pollution and absorption of storm surge waters.

In "From Commons to Commons: Evolving Concepts of Open Space in North American Cities," Rutherford Platt discussed changes in the 1980's, "when open space within urban areas assumed a new value for its influence upon urban climate, hydrology, wildlife, and ecological processes, in short, as a new form of urban common resource" (Platt 1994, 36). We have moved beyond the picturesque and other formally focused movements to a vision of the ecological city. "While specific sites are still sought for anthropocentric activities such as recreation, others are valued for their ecological and hydrological contributions to the total urban environment, regardless of ownership and management" (Platt 1994, 37).

3. URBAN PARKS AND PUBLIC HEALTH

It is helpful to put urban wetland parks within the broader context of research that examines how natural and synthetic environments affect human health and well-being. Howard Frumkin and others have measured and compared the benefits of short-term human activity in these two types of environments (Frumkin 2003; Frumkin 2001; Hartig,

et al. 2003; Kuo 2010; Wolf 2005; Barton & Pretty 2010; Wells 2000). This evidence-based research can directly support an argument for green versus, or in addition to, gray coastal resilience strategies by satisfying the quantitative bias of many policy-makers, clients, and communities. Twenty-five such studies were analyzed in the paper "A Systematic Review of Evidence for the Added Benefits to Health of Exposure to Natural Environments." The authors concluded "natural environments may have direct and positive impacts on well-being," but acknowledged the difficulty of identifying the causal pathway. "If it is found that the natural environment does bring added benefits to health and well-being over and above those arising from the activity being undertaken, it is important to understand what benefits are realized, by whom, and in which environments" (Bowler et al. 2010, 456).

In their 1989 book, *The Experience of Nature: A Psychological Perspective*, environmental psychologists Stephen Kaplan and Rachel Kaplan developed the "Attention Restoration Theory" that humans concentrate more effectively after spending time in nature (Kaplan & Kaplan 1989). Stephen Kaplan's later paper, "The Restorative Benefits of Nature: Toward an Integrative Framework," extended this research and found that "natural environments turn out to be particularly rich in the characteristics necessary for restorative experiences" (Kaplan 1995, 169; Berman et al. 2008; Kuo 2001).

Other research specifically examined the effects of natural spaces *within* cities on human health and well-being (Frumkin & Eysenbach 2004; Kuo & Sullivan 2001; Takano et al. 2002; Tinsley et al. 2002). For instance, "Green Space, Urbanity, and Health: How Strong is the Relation?" studied how the health of different socioeconomic groups is affected by parks and other green spaces within urban areas. The research showed that "The percentage of green space inside a one kilometre and a three kilometre radius had a significant relation to perceived general health. The relation was generally present at all degrees of urbanity" (Maas et al. 2006, 587). Along with geographical proximity, they found that lower socioeconomic groups, as well as the "elderly, youth, and secondary educated people in large cities seem to benefit more from presence of green areas in their living environment than other groups in large cities" (Maas et al. 2006, 587). Based on these findings, the authors noted that "green space seems to be more than just a luxury and consequently the development of green space should be allocated a more central position in spatial planning policy" (Maas et al. 2006, 587).

Informed by this research, one could expect that the local population served by the Paradise Creek Nature Park may experience greater benefits. Also important to acknowledge is E.O. Wilson's Biophilia

Hypothesis that an instinctive or evolutionary biological bond exists between humans and other living things. Wilson has defined biophilia as "the urge to affiliate with other forms of life" (Wilson 1984, 1) and "innate pleasure from living abundance and diversity" (Wilson 1998, 212). Related theories of evolutionary psychology and biophilic design support the human need for trees, animals, and natural settings. While embracing the value of evolutionary and environmental psychology studies linking human well-being to spending time in natural environments, this research also builds on scholarship that investigates the relationship between ethics and aesthetics in place design. For instance, several essays in *The Hand and the Soul: Essays on Aesthetics and Ethics in Architecture and Art* connect issues of beauty, form, and sensory pleasure with ethical obligations to the human community and the natural world (Iliescu 2009). Others have described these vital aspects as life-fulfilling functions (Daily 1999), socio-cultural fulfillment (Wallace 2007), or cultural and amenity services (de Groot et al. 2010; Kumar 2010). Perhaps cultural ecosystem services is the most relevant term—defined by the Millennium Ecosystem Assessment as "the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (Sarukhán and Whyte 2005). It is critical to acknowledge qualitative aspects that are often disregarded or undervalued in psychological or medical research that rely purely on the scientific method. This paper and design research project advances a more holistic understanding that acknowledges and builds on both qualitative and quantitative approaches that are most effective when employed together. In this way, it is possible to broaden and enrich the body of research that examines how green and natural environments affect human health and well-being.

Figure 3: Aerial View of the Paradise Creek Nature Park's constructed wetland

4. THE PARADISE CREEK NATURE PARK

4.1. Conditions on the Elizabeth River

The Paradise Creek Nature Park (fig. 1) is located in Portsmouth, Virginia (USA), within a cluster of cities in the "Virginia Beach–Norfolk–Newport News, VA–NC Metropolitan Statistical Area." This polynucleated, heavily industrialized region has over 1.7 million residents. Paradise Creek is a tributary of the Elizabeth River tidal estuary, which as Norfolk's harbor supports the world's largest naval base, and is one of the most degraded rivers in the United States (US EPA 2017; Virginia Department of Environmental Quality & Elizabeth River Project 2014). The Elizabeth River is the southernmost tributary of the Chesapeake Bay and is located within the Ramsar Chesapeake Bay Estuarine Complex. Like many coastal cities, however, tidal wetland loss has been extreme in the region and over 50% of the Elizabeth River's wetlands have been lost since 1945 (Priest 1999, 2). In addition to these challenges, sea levels in southeast Virginia are rising faster than anywhere else on the East Coast of the United States. Land subsidence in the region exacerbates this threat and persistent flooding is already problematic. Projected sea level rise in Norfolk would destroy 50 to 80% of current tidal vegetated wetlands (Wetlands Watch 2017). The situation is dire and establishing wetland parks can address several interrelated challenges.

The design for the sixteen-hectare Paradise Creek Nature Park sought to improve this situation through the construction of a five-hectare restored tidal wetland (fig. 2). The project was achieved through the Living River Restoration Trust, which received mitigation funds to offset environmental impacts that cannot be avoided elsewhere in the Elizabeth River watershed. These mitigation funds were also used for a US$5.3 million river cleanup that removed 36 million pounds of toxic river sediments from the southern branch of the Elizabeth River. The Park is part of over 200 hectares of land put into long-term conservation by the Trust. Today less than 10% of the Elizabeth River watershed is undeveloped, so the conservation of remaining land is particularly significant. In order to restore this publicly accessible wetland, the Virginia Port Authority removed 230,000 cubic meters of dredge spoils that had filled in a former branch of Paradise Creek.

The Park is located amidst contaminated industrial sites and the racially diverse and economically disadvantaged urban Cradock neighborhood. Environmental, economic, and social stresses contribute to

ecological degradation, gang violence, and public health risks in the area. There is limited public waterfront access and residents are physically and psychologically disconnected from the river. Along with these challenging constraints, the park site offered rich opportunities. In this area of horrific environmental degradation and occasional beauty, citizen-led efforts are creating wildlife meadows and rain gardens, storm water improvements, back yard habitats, and a constructed oyster reef. The US Navy has converted twenty-eight hectares of waste landfill into wildlife habitat across the creek. Today the Paradise Creek Nature Park is a primary component of these coastal restoration efforts that engage residents and visitors in a deeper relationship with their community and River.

4.2. The Design Research Paradigm and Process

In collaboration with the City of Portsmouth Department of Parks & Recreation, Portsmouth Public Schools, the Elizabeth River Project, and Crisman+Petrus Architects, a research team from the University of Virginia's *Global Sustainability Initiative* created designs for the Park and its sustainable and interactive Wetland Learning Lab and River Academy. This research paradigm built on several design research frameworks, including the *reflective practitioner* as articulated by Donald Schön, Nigel Cross' *designerly way of knowing*, Brad Haseman's *performative* research paradigm, and Alain Findeli's *project-grounded research* (Schön 1983; Cross 2011; Findeli & Bousbaci 2005). The design research method utilized in the Paradise Creek Nature Park study was initially developed in my essay, "Working on the Elizabeth River", published in the *Journal of Architectural Education's* special issue, Architectural Design as Research, Scholarship, and Inquiry (Crisman 2007; Crisman 2010).

This civically engaged design research sought to empower the community and influence public policy while investigating the question: Does experiencing a restored urban nature park amidst active industrial uses affect the visitor's well-being and resilience? There were several project design goals: to create an urban wetland park that increases human health and well-being, promotes outdoor exploration and environmental education for all ages, restores the coastal ecosystem, and mitigates the impact of sea level rise. The work was informed by a literature review of environmental and evolutionary psychology research that studies the measurable impacts of nature and urban public parks on visitor health and well-being. The first phase of the park opened to the public in 2012 (fig. 3) and construction of the *Wetland Learning Lab* was completed

in 2016 (fig. 4). *The River Academy*, a small environmental education center for park visitors, opened in 2018. Ongoing research seeks to understand how the realized Paradise Creek Nature Park contributes to improved human health and well-being for nearby residents and visitors. Surveys, interviews, and an ongoing post-occupancy evaluation are informing evidence-based best practices for the design of coastal restoration parks in industrialized urban settings.

Figure 4: Wetland Learning Lab

Figure 5: Scenes from the Paradise Creek Nature Park

4.3. Collaborating around Contamination

Community engagement and theories of agency were essential throughout the programming, design, and implementation process (Wood 2003; Boyer 1996; Giddens 1984; Latour 1987; Schneider & Till 2009; Doucet & Cupers 2009). The Paradise Creek Nature Park project began as part of a larger initiative led by the Elizabeth River Project (ERP) to restore the Paradise Creek watershed through more than twenty small-scale restoration projects. A community stakeholder committee identified the need for public park access to inspire long-term river stewardship. ERP purchased the park site and met over a two-year period with nearly fifty diverse stakeholders to develop consensus on park goals. University of Virginia (UVA) research involvement began at that point in 2006. The UVA research team collaborated with multiple external partners, including the Portsmouth Parks & Recreation Department, Portsmouth Public Schools and their Starbase Victory STEM teachers, Cradock Neighborhood Association members, the US Environmental Protection Agency, and other government agencies.

The UVA team created case studies of innovative nature parks and outdoor classrooms, studied environmental education programs, and researched the water, wetland and wildlife ecosystems and human culture and settlement history of the site. After completing a detailed site analysis, the team designed iterations for a Phase II Park plan; pavilions for educational activities, social gatherings, and individual relaxation and reflection; and play areas to promote physical activity (fig. 5). Sustainable strategies based on *SITES Guidelines and Performance Benchmarks,* such as orientation, accessibility, safety, and signs of human care were employed to create places for mental restoration, social interaction, and physical activity (Sustainable Sites Initiative 2009). Educational and interactive elements were designed to welcome people into the park, teach them about its history and culture, and heighten environmental awareness by creating restorative natural views of the river using visual and sound screening to focus visitors (Stoner 2008). The restored and healthy ecosystem of Paradise Creek Nature Park is the source of many real and measurable benefits that humans derive from a relationship with nature. Together we worked to restore living resources, plan for sea level rise, conserve land, increase public access, and expand citizen stewardship of the Park and the Chesapeake Bay. Several outreach methods engaged key stakeholders to build public support. For instance, twenty at-risk youth became Park Ambassadors (fig. 6). They removed invasive species, grew native plants, educated the community, and provided input on the

park design. Connecting both academic learning and community action with the desire to make a positive difference in the world forged a commitment to environmental ethics and sustainable practices.

4.4. Results at the Park

Today the Paradise Creek Nature Park meets the needs of diverse visitors in one of the most populated regions of Virginia. The Park is the first public landscape in the Hampton Roads metropolitan area with the primary purpose of engaging over 20,000 citizens a year in environmental stewardship of the Chesapeake Bay through public river access and conservation education. Park visitors include inner-city students and families lacking access to meaningful outdoor experiences and missing out on the well-being that comes with green space. The park connects residents with their home river at physical and psychological levels. Reconnection to the Elizabeth as a living river is essential to sustain public support for ongoing coastal restoration efforts. Surrounded on three sides by heavy industrial uses, the Park is a place of reconciliation between industry and environment. Neighboring industries have been crucial partners in pollution reduction and habitat restoration projects. Many participate in the *River Stars* program that provide free technical assistance to help businesses develop and implement green strategies ranging from reducing pollutants to restoring wetlands on their property. The Paradise Creek Nature Park has increased green space in the distressed city of Portsmouth, which as the poorest of four cities in the watershed, has only one third of the park space recommended for its size.

Several project outcomes contribute to the design goal of increasing a sense of well-being and health for Park visitors and nearby residents. The park landscape, buildings, and exhibits were designed to be visitor-centered, inquiry-based, and interactive. Stormwater is managed using permeable paving, bioretention swales and rain gardens. The performance of this green infrastructure is monitored and measured green by calculating nutrient reductions using the Virginia Stormwater Management Nutrient Design System. Crisman+Petrus Architects designed the Wetland Learning Lab's butterfly roof to collect and filter rainwater in a native plant rain garden. Using the elements of portal, path, destination, and sense of surround, the designs educate visitors about the value of coastal restoration, green infrastructure, tidal wetlands, riparian buffer conservation, native plants, and the role of the citizen steward. A handicapped-accessible boat launch and clear-bottom kayaks provide

access and wetlands exploration for all ages and abilities. The River Academy provides an indoor classroom, community meeting space and exhibits to complement field investigations, along with public restrooms for park visitors. Crisman+Petrus Architects designed the building with sustainable systems, including natural ventilation and daylighting, electricity generated by photovoltaics, rainwater collection, composting toilets, and a native plant water filtration garden.

Public engagement and increased environmental stewardship is evaluated based on the number of park visitors and their level of participation. For instance, over 1,000 adults and children have volunteered to remove invasive plants, plant native trees, weed garden beds, and maintain park spaces. Others participate in the Park's popular Forestry Stewardship Corps and Volunteer Service Days. The Elizabeth River Project offers environmental education workshops and guided tours throughout the year to engage local residents. Along with these public events, the Paradise Creek Nature Park offers daily environmental education programs for local school children of all ages. For instance, all fifth-grade students from Portsmouth Public Schools and all preschoolers from Norfolk Public Schools take fieldtrips to the Park each year. In the Wetlands in the Classroom program, each year over 7,000 students grow native trees and grasses at their schools and then plant them at Elizabeth River wetland sites. With the support of a National Oceanic and Atmospheric Association grant, the research team has developed one of the first education programs on the East Coast to teach youth to adapt to sea level rise.

The research includes pedagogical outcomes for University of Virginia students as well. Working with diverse community partners and real-world constraints, the project empowered the involved University students to develop their research, design and communication skills, while learning about intertwined issues of human health and sustainable design, environmental education, and community engagement. The University students connected sustainability education with their lives as citizens making a positive difference in the world. Their work has contributed to the city of Portsmouth and the entire Hampton Roads region by establishing a translatable model for sustainable coastal restoration and public recreation that physically and spiritually engages this urban community.

Figure 6: A family outing (left) and Park Ambassadors at the Paradise Creek Nature Park (right)

5. CONCLUSION

This case study examined how a university-community collaboration and innovative design research raised public awareness of connections between design and health, while fostering a commitment to sustainable coastal restoration and environmental stewardship. As the research is disseminated through publications and exhibitions, the project is becoming a national model for how a public park may promote health and well-being in the midst of industrial uses and a stressed urban community. The Paradise Creek Nature Park project empowered an urban community in need, while designing, implementing and testing translatable strategies for creating healthy, public landscapes. The necessity of integrating resilient coastal design strategies and public health and advocacy policies is escalating as sea levels rise.

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Barriers Preventing Development of Integrated Stormwater Management in Helsinki, Finland

Elisa Lähde
Kajsa Rosqvist

ABSTRACT

In recent years, the development of sustainable urban stormwater management has been much in focus in several cities in Finland due to climate change and new regulations. Urban adaptation to climate change requires solutions that combine underground and aboveground measures and processes. However, the transition towards a water sensitive city, where multifunctional green infrastructure and urban design reinforce water sensitive behavior, is not trouble-free. Various barriers have been identified, such as a lack of knowledge as well as unclear roles and responsibilities among stakeholders.

In the city of Helsinki, the present stormwater strategy has currently been updated to an integrated stormwater program. For this purpose, a workshop was organized for civil servants and experts working with storm water issues in different city departments. In the workshop, different measures and solutions required to reach the goals of the new program were discussed in order to define adequate actions. The preliminary goals of the strategy were: 1) the prevention of stormwater related problems, 2) climate-proof local and regional drainage, 3) qualitative and quantitative stormwater management, 4) use of stormwater as a resource in urban environments, and 5) integrated stormwater management within city administration.

The workshop discussions revealed that civil servants and experts knew and understood quite well the main goals of the program. However, the participants displayed gaps in other areas of knowledge. There was a lack of knowledge on sustainable drainage components and their variety of delivered ecosystem services. Stormwater management is still comprehended as a technological challenge with the multifunctionality of green infrastructure solutions not being fully utilized in urban design. Several approaches are needed to continue the development of the water-sensitive city in Helsinki, including more real life examples, broader stakeholder involvement outside the building sector, and a critical examination of existing planning procedures.

Keywords: integrated stormwater management, SUDS, urban water management, green infrastructure, water sensitive urban design

1. INTRODUCTION

1.1. Sustainable urban drainage systems

Increased precipitation and changing rainfall patterns are predicted to be one of the major effects of climate change (IPCC 2014). In combination with on-going urbanization and diminishing green spaces available, urban runoff will undoubtedly increase. This will in turn increase the risk of flooding and decrease the quality of receiving waters. As sustainable urban drainage systems (SUDS) are able to improve stormwater management in both quality and quantity as well as deliver additional related benefits, SUDS have been developed and promoted by an increasing number of communities worldwide.

SUDS restore natural environments and use natural processes (infiltration, evapotranspiration, filtration, retention, and reuse) to mimic the natural water cycle of a site. In different contexts, these practices can be referred to by other similar terms, such as low-impact development (LID), best management practices (BMP), water-sensitive urban design (WSUD), low-impact urban design and development (LIUDD), not to mention green infrastructure (GI) (Fletcher et al. 2015). Some of these approaches more heavily emphasize water quality and quantity management (e.g., LID), and others the provision of ecosystem services (e.g., GI). In this paper, the term SUDS is used to describe all kinds of sustainable urban drainage systems that deal with surface water in an alternative way to mainstream conventional drainage practices.

SUDS can be categorized into structural and non-structural solutions. Non-structural solutions can include urban planning and education (Elliott and Trowsdale 2007). Structural solutions can be categorized according to their function (such as on source management components, conveyance components and infiltration/detention components) including green roofs, rainwater tanks, permeable surfaces, bioswales, rain gardens, planter boxes, and vegetated basins (Susdrain 2017). For the best treatment result, a treatment train should be used (Revitt et al. 2014). It is a combination of multiple, complementary SUDS components designed to meet the needs of a particular environment to achieve a better overall quality and quantity management.

Structural SUDS components are multifunctional and can, in addition to stormwater management, deliver various other ecosystem services. These include air quality improvement, mitigation of climate

change by reducing greenhouse gases, energy savings by shading and insulation, reduction of urban heat island formation, and improvement of community livability (such as aesthetics, recreation, and improvement of habitats) (Demuzere et al. 2014; Scholz 2014, Scholz et al. 2013). Ecosystem services can help cities transition towards more sustainable environments, which might be resilient to changing conditions in the future (Lundy and Wade, 2011).

1.2. The transition process of cities

In addition to climate adaptation, a growing demand of savings in infrastructure costs has led to a greater interest in the added value of multifunctional SUDS (Wright et al. 2016). In order to promote SUDS and related benefits, many cities worldwide have composed their own stormwater programs or strategies. In the programs, priority is awarded to on source management and detention of stormwater over conventional systems. This so-called priority order of stormwater management enhances the natural hydrology of the site even in post-development conditions.

In Finland, sustainable stormwater management is required by law (MRL 1999), and almost all large and midsize cities have implemented the requirements by conducting their own stormwater programs. Helsinki, the capital of Finland, released its own stormwater strategy in 2008 (City of Helsinki 2008) making it the first city in the country to do so. An interdisciplinary city internal working group together with a steering group drafted the strategy in order to promote interaction between different departments of municipal government (Salminen 2013, 13). The aim of the strategy was appropriate and site-based stormwater management. However, implementation of the existing strategy has not been completely successful (Salminen 2013, 41); thus, the present stormwater strategy is currently being updated to an integrated stormwater program.

This paper investigates the preconditions required to achieve the aims of the new integrated stormwater program. Data for the paper has been collected during a workshop organized within the city of Helsinki in April 2017. The purpose of the workshop was to address the aims of the new integrated stormwater program and find actions to jointly reach these aims with 21 civil servants and experts representing the different departments handling storm water management within the city of Helsinki.

During the workshop discussions, the participants identified any barriers of implementation concerning the present strategy, and proposed consequent actions to overcome them. However, many of the barriers preventing implementation can be difficult to identify, because they are embedded within organizational cultures, practices and processes (O'Donnell et al. 2017). Thus, the research questions of the paper are: 1) What kinds of barriers can the participants themselves identify? 2) Which other barriers can be identified in the workshop discussions?

The aim of the paper is to define the baseline understanding of stakeholders within the different departments of the municipal government dealing with stormwater management. This will help to create appropriate actions for an integrated stormwater program and to transform Helsinki into a water-sensitive city. For other cities and authorities outside Helsinki, the results of the paper can provide a valuable case for comparison and help to identify their own barriers.

2. INTEGRATED STORMWATER MANAGEMENT

For already a few decades, the decentralized, on source approach has been a new paradigm in urban stormwater management (Marsalek and Chocat 2002). Previously, urban drainage was seen only as a problem, but related opportunities, such as increased biodiversity and climate adaptation, are currently widely recognized (Ashley et al. 2013). This type of approach, called integrated stormwater management, emphasizes a use of multifunctional on source controls, a transition from traditional drainage to green infrastructures, and a consideration of additional environmental benefits (Mailhot and Duchence 2010).

An integrated stormwater management approach has been implemented in practice particularly in the northern cities and states of North America, such as Vancouver, Seattle, and Portland, and in Australian cities, such as Melbourne. Since their involvement in SUDS beginning in the 1990s, these cities have already been actively monitoring the effects of integrated stormwater management on drainage servicing, land use planning and environmental protection (Hottenroth et al. 1999; Brown et al. 2013). During the past two decades, there has also been a remarkable number of successful examples of realized SUDS projects. However, wide-scale implementation of SUDS has been limited (Brown 2005) because many cities are still heavily investing in mainstream conventional drainage practices (Wong and Brown 2009).

Brown et al (2009) have created a framework describing the

transition population growth and climate change, and it is essential for all cities to invest in solutions that will also "deliver [a] long-term sustainable outcome" in water management (Brown et al. 2009).

Barriers hindering the implementation of SUDS have been identified in different studies (Kim et al. 2017; Ashley et al. 2015; Thorne et al. 2015; Brown and Farrelly 2009; O`Donnell et al. 2017). There are technical barriers that include suspicion concerning hydrological performance, service delivery and maintenance. However, socio-institutional barriers are more serious. These include a lack of confidence that decision makers and communities will accept, support, and take ownership of SUDS (Thorne et al. 2015). Stakeholders' lack of knowledge hinders the planning and design of the solutions (Kim et al. 2017); moreover, despite several successful case examples, SUDS are still regarded as novel practices; the resistance to change existing practices also represents a relevant barrier (O`Donnell et al. 2017). Additionally, in the Finnish context, unstable procedures, unclear roles and responsibilities, a lack of knowledge and monitoring hinder the efficient implementation of integrated stormwater management (Salminen 2013, 41).

Different tools, models and frameworks have been designed to improve and facilitate communication and participation between different stakeholders (Ruiz et al. 2017). One of the most influential frameworks is the Three Points Approach (3PA), created by Fratini et al. (2012) and further developed by Sorup et al. (2016) and Digman et al. (2014), which aids in turning the problem of adapting to changing flood risks into a positive opportunity for the development and enhancement of urban areas. This is accomplished through utilizing the interactions and synergies between the surface water management system and society.

In the 3PA, three levels of stormwater management have been categorized for different rain events: 1) Technical optimization: where design standards for sewers and other infrastructure apply. This considers technical solutions which deal with defined design storms to prevent damage and meet service levels; 2) Urban resilience and spatial planning: involves dealing with extreme events, which becomes of necessity multi-disciplinary. The aim is to mitigate the impacts of future extreme events and allow adaptation; 3) Day to day values for small rain events: enhancing the value provided by options, awareness, acceptance and participation amongst stakeholders. Attention is paid to the way urban space is used and perceived.

The results of the three points approach are multifunctional solutions and opportunities for consensus in a decision-making process involving different stakeholders (Frantini et al. 2012). On a practical

level, the implementation of 3PA would mean that the potential benefits of the stormwater management are emphasized when dealing with design storms or smaller rain events. The management of extreme events should be integrated into urban planning projects, such as redevelopment of an area, with an emphasis on damage control and multifunctional infrastructure (Digman et al. 2014).

In Scandinavia, the cities of Malmö in Sweden and Copenhagen in Denmark are the leading cities implementing the integrated stormwater management approach. Despite similar climate conditions, the two cities have chosen different approaches towards stormwater management (Haghighatafshar et al. 2014). In Malmö, since the early 1990s, there has been a shift towards open solutions in stormwater management. The main objectives of the SUDS are to decrease and slow down the runoff flow in the urban areas ensuring that the existing piping network does not become overloaded (Stahre 2008, 14). SUDS have simultaneously been used as a tool for urban improvement, for example, in Augustenborg (a local suburb).

Copenhagen, on the other hand, does not have a long history in SUDS, but due to intensive flooding in 2011, stormwater management is presently considered to be one of their priorities in urban planning (Haghighatafshar et al. 2014). The city has a new Cloudburst Management Plan (City of Copenhagen 2012), which proposes that public surfaces, such as parks, sport fields and open spaces, be used for temporary storage of stormwater during a heavy rain event. Flood protection of the city center is further emphasized by proposing additional measures, such as especial stormwater streets, waterways and underground tunnels, which could effectively lead stormwater to the sea and simultaneously increase local greenery. Therefore, with 3PA in mind, Copenhagen has focused during the last few years on solving the problems associated with extreme rain, while design rain and local green infrastructure have been more underlined in Malmö (Haghighatafshar et al. 2014).

The examples from Copenhagen and Malmö show the means by which SUDS are successfully used as local solutions, which can be combined with conventional techniques and retrofitted into existing drainage systems. Furthermore, they underline the ways in which a classically engineered piping system promoting efficient drainage offers a technocratic solution that diminishes our understanding of and connection with nature (Winz et al. 2011). By contrast, SUDS combine drainage functions and vegetation, and their role can be expanded from solely stormwater management to cover ecological targets and built environment services, such as identity or amenity. Furthermore,

SUDS could potentially form a novel link between ecological, social and technical realms, thus creating a complex social-ecological system (Hoang and Fenner 2016; Flynn and Davidson 2016; Dunn et al 2017) where the different benefits of a total urban water cycle are included.

This kind of system approach considers draining functions together with flood protection, public health protection, environmental protection, amenity and recreation, carbon neutrality, economic development, equity and long-term sustainability, thus enlarging the traditional scope of engineered solutions (Wong and Brown 2009). Thus, optimal outcomes in urban stormwater management will only be achieved if the dynamics of climate, land use, ecosystems and society can all be considered, because the interactions between the components of the urban water cycle are as important as the individual components (Fletcher et al. 2013). This leads to the requirement to develop new types of working models and collaboration. Urban stormwater management is an inevitably complex issue requiring an integrated, transdisciplinary approach and systems thinking.

3. METHODOLOGY

The data was collected in a workshop organized on April 26, 2017 in the City of Helsinki Environment Centre. The workshop was organized to support the updating process of the existing stormwater strategy for the city of Helsinki into an integrated stormwater management program. Twenty-one participants representing all technical departments of municipal administration attended the workshop. These included the Public Works Department, Environment Center, City Planning Department, Real Estate Department and Building Inspection Department (due to the organizational rearrangements these departments were renamed in the beginning of June 2017). Other participants included the City Executive Office, Helsinki Region Environmental Services Authority, and Aalto University. All participants deal with stormwater issues in their daily work.

Updating the stormwater strategy to an integrated program is part of the iWater – Integrated Storm Water Management project, which is financed by the EU Interreg Central Baltic program. A particular municipal stormwater group consisting of 11 members from the key technical departments within the city is responsible for the updating process, and it has outlined tentative goals for the new integrated stormwater program based on an earlier survey of the departments and organizations present

in the workshop (except Aalto University), the draft for the city's new strategy program (2017-2021) and the City of Helsinki Climate Adaptation Guidelines (2017-2021). The aim of the workshop was to inform various stakeholders within the city about the ongoing updating process and suggested tentative goals, while simultaneously discussing different needs and potential actions for the new program.

In the beginning of the workshop, the aim and schedule of the workshop were introduced to the participants. Then the participants were randomly divided into four small groups (1, 2, 3, and 4), thus ensuring that participants from the same department were not in the same group. Large paper charts were handed to every group (Figure 1). On the charts, the starting circle was drawn on the left side and the goals listed on the right. Between the starting circle and each goal a timeline was drawn. The first task of the participants was to list actions for achieving each of the goals and to add them in chronological order to the timeline with Post-it notes. Responsible bodies for the proposed actions were also added. Thereafter, two groups joined together presenting their own timelines to each other and identifying potential larger concepts. Finally, the identified concepts were prioritized.

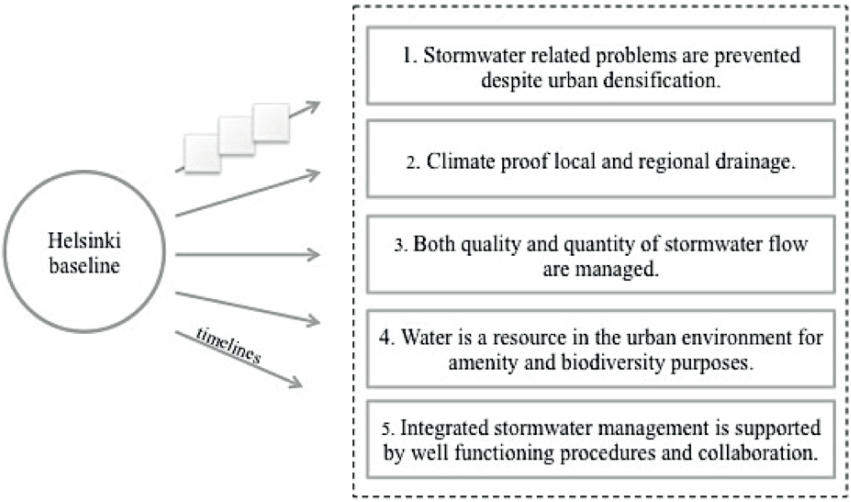

Figure 1: Image of the paper charts used in the workshop. The baseline situation is located on the left side and goals for the new strategy on the right. Participants were asked to add Post-it notes with proposed actions to the timelines drawn from the baseline to each of the goals.

The workshop lasted four hours including a 10-minute break for refreshments. Groups had a chairperson responsible for leading the discussion and ensuring that all the goals were handled. The discussions were lively with all able to contribute due to the small size of the groups. The workshop format helped to reflect on the aspirations and comparative knowledge of different participant groups. Researchers were among the members of two of the groups, but they refrained from consciously leading the discussion towards any specific direction or outcome. Discussions in each group during the filling of the paper charts were recorded and later transcribed. Participants also knew that discussions were being recorded. The data was analyzed to reveal distinctive themes that helped to identify the barriers for implementation of the integrated stormwater management.

4. RESULTS

4.1. Barriers identified by the participants

The participants were relatively familiar with the tentative goals of the integrated stormwater program. The discussion proceeded smoothly without misunderstandings or disagreements. This is not surprising, because goals 1-4 are the same in the earlier stormwater strategy and well known among those working with stormwater issues. The participants also shared the common understanding that stormwater runoff should be managed to achieve maximum benefits in the urban environment. Recreation possibilities and environmental benefits, such as biodiversity, were highlighted in several discussions.

Participants were able to recognize several barriers to effective stormwater management. The principal problem mentioned was the lack of knowledge on two levels:

1) On a technical design level, participants asked for recommendable Finnish examples of SUDS. Furthermore, a watershed-scale approach was lacking and stormwater management was only considered when entering the detail-planning phase. The need for an easily accessible database with technical information was mentioned several times. The database could show potential flood risk areas, as well as suitable places for stormwater detention and infiltration on a watershed scale. This would help planners to understand the effect of local urban densification projects on larger watershed hydrology.

2) On an administrative level, many knowledge related barriers were identified. It became apparent from several discussions that different stakeholders, such as planners, building supervisors, decision makers, developers, contractors or maintainers, do not share mutual skills and understanding. A good example here is a short discussion about the management priority order:

"I bet that if you go and ask developers about the priority order, they won't have a clue."
"But not all the planners will have one either."

Knowledge-sharing and management between different authorities and municipal organizations were seen to be problematic. Together with the general lack of roles and responsibilities, it hinders implementation of any existing strategy. Furthermore, the lack of indicators and monitoring was mentioned because it does not allow any feedback from accomplished actions.

The participants experienced that existing conventional practices and "the way things are done" are hard to change. Even the terminology related to a new approach can be challenging as revealed by a discussion about "natural stormwater management" (as SUDS is referred to in Finnish) and associated interrelations between the natural and technical systems:

"Which kinds of changes are required in our existing operational environment?"
"A change in attitude. It is a common thing to think that we don't want those puddles and ponds here."
"And terminology can be a bit difficult. Such as natural stormwater management, which creates stereotypically a vision of some sort of ditch in the brush and that is not wanted in an urban environment. We need more awareness, so that even if we carry out natural management, the solution doesn't necessarily need to imitate natural aesthetics. Natural processes can be integrated into a very urban context with compatible structures."

4.2. Additional uncovered barriers

Although participants independently named many hindering factors, there are two types of barriers that were not discussed, but which rose out of the recorded discourse. First of all, the terminology and functionality of different SUDS components are only vaguely known. Secondly, understanding about potential stakeholders is limited.

Although the goals of the stormwater strategy were familiar to the participants, the details of practical management and functionality of different SUDS components were not well understood. For example, as a

method to decrease urban runoff, stormwater infiltration and permeable surfaces were mentioned much more often than detention structures; if infiltration were impossible because of the soil type, controlled conveyance was mentioned as an option. Furthermore, the participants did not necessarily possess the correct terminology as the following discussion concerning urban management options shows:

"I was thinking about those very small scale structures that could fit densely built areas. Like the ones they have in Malmö, in schoolyards and also on the streetscape, these built concrete channels with vegetation integrated. Or, how do you call them, the containers or such, which are located underground."
"Yes, geocellular storage tanks."
"Yes. And also utilization of roofs and facades. These should be known and used, and our basic operating model should be based on these kinds of solutions."

The concept of treatment train was not used in the discussion, which might be explained by the lack of practical knowledge. Different SUDS components were seen to be more alternative than complementary to each other. The participants had some understanding that components can create larger systems, but practical knowledge was not strongly evident. However, participants were themselves conscious of this barrier as the following discussion concerning the third goal reveals:

"I have listed some very general and nonspecific principles here. In general, we should use more intensively green structures and infiltration, and question the use of pipe drainage. Especially in the upper parts of the watershed, like, do we need to put water in the pipes every time? These measures are related to the implementation of the priority order. However, I haven't added who does it, or how it is done, or what is the practical action."
"Yes, these are very important issues. And it is very difficult to take it a step further. Like what would be the elaborated solution."
"Yes, (it is difficult) to name who does what."

3PA and differences in management actions between regular rain events and extreme rains were discussed in two groups. While it is well understood that the climate change will probably increase the need for flood risk management, the means to handle the extreme event management, the ways it differs from management of design rains or should be considered as part of spatial planning are not known in detail. Only one participant proposed especial multifunctional structures, where flooding could be allowed temporarily with the site being possibly used for other purposes at other times. A more common approach to the effects of climate change is better conveyance:

"We need to fix our stormwater drainage system"
"Does that mean reconsidering dimensions or what?"
"Well, that is quite difficult to say."
"But it doesn't help at all to make larger pipes on the source, water would only flow faster to the end of the pipe. We would need more sustainable drainage systems."
"Water detention maybe."
"Or we would need some sort of backup routes for excess water."
"Flooding routes."
"Yes, that's it. Flooding routes."

As a second uncovered barrier, the recognition of possible stakeholders is still limited. In Helsinki, the organizational structure of the municipal administration was reformed at the beginning of June 2017. Previous departments and municipal enterprises were reorganized into administrative sectors according to their functions. During the workshop, the organizational reform was under preparation and the participants firmly believed that the new organizational structure will solve problems related to collaboration and knowledge sharing between different actors in stormwater management.

However, the creation of strong integrated stormwater management practices requires acceptance from a wide range of stakeholders, including some not traditionally interested in drainage matters, such as the health or education authorities (Ashley et al 2015). These groups were not mentioned in the workshop discussions, although they are part of it, such as the city's climate change adaptation workgroup, because participants only concentrated on the planning and building sector operators. It is also a common understanding among participants that the value of benefits delivered by SUDS is targeted only to direct stakeholders, such as the maintenance side. In the following discussion concerning possible pilot structures, the monetary value of potential ecosystem services (such as health benefits) is not mentioned, but only the value of the collected water itself is recognized:

"If we were able to do pilot structures and people would see the benefits, the appreciation would follow. And it would be easier to build the next one, even if it was a bit more expensive."
"Yes. When thinking about investing costs and maintenance costs (of SUDS components), how are they related? I'm not familiar with this at all."
"It is a bit tricky, because a constructor is not normally responsible for maintenance. It doesn't matter to them if the solution is better or cheaper in the long run. They only go for something new if they are forced to do so."
"That is the reason why we should emphasize piloting, when we are developing public open spaces. In the maintenance phase, the saving could be the possibility to utilize water in irrigation. "
"Yes. Should you add the irrigation in the potential benefits here on the paper?"

5. DISCUSSION

The civil servants and experts of the city of Helsinki participating in the stormwater workshop mentioned relevant barriers to the implementation of the integrated stormwater program, such as a lack of knowledge, lack of native pilot projects and attitude challenges related to conventional practices. Based on the discourse, additional barriers were identified, such as a vague use of terminology, lack of understanding of the details of practical management or the functionality of different SUDS components. The results can be viewed in the light of SUDS presenting a new approach that will widen the previously technocratic traditional drainage system into a more complex social-ecological system combining not only urban hydrology, but also potential ecological and sociological benefits through ecosystem services (Flynn and Davidson 2016; Winz et al. 2011). In the past, water managers have often reduced this complexity by focusing on optimizing singular parts of the water cycle, such as piping drainage in isolation, without considering other dimensions of the total urban water cycle (Wong and Brown 2009). The results from the workshop in Helsinki reflect the challenges confronted when enlarging the scope from simple technical solutions to a more complex system.

Many examples show that integration of natural approaches for conveying and treating stormwater runoff in an urban environment has been difficult because existing routines, infrastructures, institutions and cultures are persistent and highly interwoven (Brown et al. 2013). The challenge of attitudes mentioned in the workshop are a sign of path dependency, a common phenomenon in sustainability-transitions (Markard et al. 2012) where socio-institutional routines of past practices prevent the adoption of better alternatives even when they are available. Furthermore, the vague understanding of the functionality of different SUDS reveals that stormwater management is still understood as a solely technocratic issue instead of regarding the opportunities of the complete social-ecological system. In the workshop, participants suggested that SUDS should substitute piping solutions without being able to name more specifically which SUDS function (e.g. source management, conveyance and infiltration / detention) could be used. Naturally, all the planners do not need to know the technical details, but an understanding of the basic management options would help to plan and route the movement of the water through built structures.

Since water in urban planning has traditionally been regarded as a one-dimensional element that needs to be removed from the urban space, it is demanding to comprehend SUDS as a multifunctional interface

between the technological, social and ecological structures. It requires new skills and further research (Flynn and Davidson 2016) to consider the best approach to match the demands of an ecosystem service of a unique planning site with the potential ecosystem service provision of a combination of SUDS components. However, this approach could be highly rewarding from an urban design point of view. If the functionality and potential benefits of SUDS are correctly understood, it is possible to create comprehensive treatment trains that have high amenity, recreational, identity and ecological values (Haase 2015).

As social-ecological system interactions, multifunctionality and the value of SUDS related benefits (mainly ecosystem services) are still not completely understood, it can be hard to justify SUDS related investments. Moreover, this limits recognition of possible stakeholders. For example, if the potential of health benefits, such as reduced particular pollution or encouraged outdoor activity, were internalized, the public health sector could also be identified as a potential stakeholder. In order to effectively create and implement the integrated stormwater management program, communication between different stakeholders needs to be strengthened and adaptive transdisciplinary practices developed (Ruiz et al. 2015). To advance the sustainable management of urban water, it is essential to bring together stakeholders with differing backgrounds and interests to create new understandings and relationships.

Consequently, knowledge gaps hinder an accurate consideration of the space requirements of SUDS components in land use planning processes. This is further emphasized when flood protection measures are integrated into the urban environment. Adequate spaces and routes for management of extreme rain events should be recognized and combined with other urban functions. Climate change requires new ideas for a dynamic approach (Digman et al. 2014) where a multifunctional infrastructure and shared spaces help to adapt to climate change. Indeed, climate change enhances the necessity to better link stormwater management into urban planning and design, because there is uncertainty about the quantities of surface water generated in the future (Ashley et al. 2015). In Helsinki, the existing barriers are currently hindering the creation of this linkage.

Nevertheless, the participants were able to identify two possible turning points for the development of integrated stormwater management: the need for pilot projects and new organization. Pilot projects are valuable as research literature and case studies encourage a learning-by-doing approach, where local niche innovations gradually grow into regime changes and further into new institutional structures

(Dunn et al. 2017; Brown et al. 2013). Piloting allows mutual learning and offers an opportunity to test and study solutions that fit into the local social-ecological system.

Participants possessed a strong faith in the new sector-based organization of the city of Helsinki. A new type of collaboration with different stakeholders can indeed result in overcoming knowledge-related barriers (O'Donnell et al. 2017). Earlier studies show that at the beginning of the sustainability transitions the influence of a small group of frontrunners can be remarkable in bringing the requisite skills, knowledge, influence and resources required to navigate or steer the transition pathway (Dunn et al. 2017). Nevertheless, in the acceleration phase of transition, institutional work is essential. New technologies cannot be developed in isolation, but need to be socially embedded into the local institutional context (Wong and Brown 2009).

In the end, neither a fully green nor entirely grey infrastructure approach to stormwater management will likely be optimal at any location (Winz et al. 2011). Instead, long-term solutions should be based on the best assets of both the grey and green infrastructure; in addition, the unique characteristics of a local social-ecological system dealing with urban water should be carefully considered (Flynn and Davidson 2016). When scrutinizing the development of the city of Helsinki towards more sustainable urban water management, one can detect emerging innovation processes and technologies, which have begun to destabilize the existing practices. As a successful transition into integrated stormwater management requires co-evolution between external systemic changes (such as the pressure of climate change), the activity of frontrunners, institutional development, and experiments (Dunn et al. 2017), it is critical to facilitate mutual learning, networking, diffusion and the embedding of new technologies in order to further accelerate the transition development.

The workshop also demonstrated that different organizations of the city already have active forerunners, who possess essential knowledge about new technologies and their possibilities. However, there will not be one single actor, agency or discipline that could resolve these complex urban water issues on its own (Dunn et al, 2017); instead, actors need to form networks and collaborate across departments and sectors. There is a need for new formal and informal agents and networks that strengthen linkages across systems and enable knowledge exchange (Wenn et al, 2015). In that sense, the city's internal stormwater group is already a good initiative for cross-sectorial networking. Nevertheless, there is still a need for a critical examination of the way existing planning procedures

support the formation and use of formal and informal linkages as well as creation of an adaptive administrative system.

The results of this paper are based on the single workshop event with a limited amount of participants. In order to gain a more in-depth understanding of the existing barriers to integrated stormwater management or the on-going transition process in Helsinki, the results could be used to compose a questionnaire or interview questions for a larger participant group. Especially the relation between the existing land use planning procedures and the stormwater management should be studied more carefully in order to enable the development of water-sensitive urban design practices and a deeper understanding of potential benefits delivered by an adequate use of SUDS. In addition, there might be some general policies that were not mentioned in the workshop, such as the new master plan of the city of Helsinki, or the demand for city densification that subliminally affects the way in which planners regard stormwater management.

6. CONCLUSIONS

The discussions in the workshop revealed that the civil servants and experts knew and understood well the preliminary goals of the new integrated stormwater program. However, the participants have other knowledge gaps preventing implementation of the integrated stormwater program. This lack of practical knowledge hinders the integration of stormwater management practices into land use planning, which complicates the climate change adaptation.

The purpose of an integrated stormwater program is to provide direction for future development plans and identify infrastructure needs. It was well understood among the workshop participants that a better urban environment is created if local hydrology can guide land use decisions. However, there is a lack of adequate tools to apply this principle in practice. Furthermore, a general lack of awareness is causing reluctance to change existing practices among various stakeholders.

It has been noted in this study that a desired transition to integrated stormwater management requires a systemic change from a technocratic approach to the implementation of a wider social-ecological system approach. Thus, the interrelationship of stormwater management must be considered with other sectors (such as energy, transport, health), and recognition of potential stakeholders should extend beyond city organization to other sectors, such as academia, industry,

business, nongovernmental organizations, politics, and the local public. Collaboration with non-administrative actors would deliver a deeper understanding about SUDS related benefits, which in turn would help to close knowledge gaps and overcome the reluctance to support novel approaches. Changes in the existing planning procedures might be needed in order to enable extensive gross-sectorial collaboration.

In addition, it is important to understand that the five goals set as outcomes of the new integrated stormwater management program are still not the final phase. The city, its institutions and administration are engaged in a sustainability transition process where the new integrated stormwater management program is showing the direction and indicating a structural shift in the policies that govern the relationship between society and the environment. Nonetheless, work has just begun as examples of forerunner cities show that the development of a water sensitive city requires long-term and persistent action on a wide front, an adaptive approach, and a conscious building of active linkages in the new social ecological system.

* Note: The stormwater management program of the city of Helsinki was finalized during 2017 and will be sent to the city council for acceptance in 2018. Several of the identified challenges in this paper were transformed into actions listed in the program.

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SECTION TWO
SETTLEMENTS, MOBILITY AND REGENERATION STRATEGIES

Reframing Cities with Peripheral Settlements under the Decentralization Discourse: The Case of Amman, Jordan

Alia'a K. Amr

ABSTRACT

The rapid spatial growth of the urban peripheries of Amman, the capital of Jordan, calls for an immediate reconsideration of the enforced planning policies that govern it. This paper therefore casts light on the implementation of the decentralization discourse in one problematic area in the Middle East, Amman City, focusing on the administrative decentralization of decision-making, and the resulting transfer of urban competencies and urban services.

This research intends to investigate the decentralized administration and its application in urban planning policy by tracing the history of one of Amman's satellite towns, Sahab. The study will assess the effectiveness and success of the policy implementation, and the relationship between the Amman City core and its marginal urban node, spatially and functionally. The study has used the international literature, data published from a number of Jordanian public departments, and structured interviews conducted with planners from Greater Amman Municipality (GAM), the Sahab municipality, and random sampling of the local community.

The results of this research indicate that the deep-rooted centralized authority of Greater Amman Municipality (GAM) clearly runs contrary to the hoped for decentralization approach. Accordingly, the current urban policies have failed, on the administrative and planning level, to create an autonomous or even semi-autonomous urban node. Instead, an unbalanced relationship can be observed between the Amman City core and Sahab, the satellite town. Finally, the paper closes by calling for appropriate institutionalization of the development plans and realistic implementation of spatial policies.

Key words: urban policies, decentralization approach, satellite town.

1. INTRODUCTION

For a long time, the concept of decentralized urban governance and deconcentration has been of vital importance in the urban development discourse in both the practical and academic literature. The concept of centralization and decentralization is primarily related to the degree of the delegation of authority and decision-making at any level. Practically, there can be no absolute state of central administration—implying as this does no local administration whatsoever—and absolute decentralization of administration is also impossible (Sakyi 2013, 53). However, re-examining urban relations between region, city and town, considering the local, regional, and national aspects, has an essential role in the city urban design process (Shah 2006, 2).

Theoretically, decentralized urban management would support the role of municipalities in the decision-making process, increase their network efficiency, and strengthen the communication mechanisms between the established central authority and more recently emerged units. However, the key challenge facing decentralized governance is how to qualify the role and power of the city's main municipality—the body that controls the whole urban development process—with respect to sub-municipalities. This can be clarified by understanding of the fact that the term decentralized urban governance comprises three main areas: national politics, local governance, and urban-rural development. Although these areas may have distinct delineations, there is a clear need for greater conceptual grasp of the operational interaction between them, starting from their shared characteristics (UNDP 2004, 4).

In general, to achieve successful decentralized urban governance, several conditions are required: administrative feasibility, adequate fiscal autonomy, a functioning local democracy, and technical expertise among local and national government officials (Shah 2006, 5). These conditions correspond to three levels of decentralization: political, administrative, and financial (Litvack et al. 1998, 4–6). Ignoring one of these conditions or levels will lead to adverse urban, spatial, and economic outcomes (Shah 2006, 5).

Moreover, as the common denominator between the political and financial levels, administrative urban decentralization is defined as the restructuring of the central authority and the redistributing of power and resources to lower administrative levels. Without nullifying the central authority, this state of power restructuring aims to control urban expansion by creating semi-autonomous urban nodes, along with proposed urban corridors (SOFRECO 2010, 6). Three forms of administrative

decentralization have been used in planning policies to achieve this process: devolution, deconcentration, and delegation. An integrated coordination of the three administrative forms under appropriate settings is needed to produce master plans that can appropriately manage local resources, urban services, and spatial growth.

2. METHODOLOGY AND THE STUDY AREA

This paper evaluates the efficiency of decentralized urban planning management in Amman. One of the main goals of this research is to draw attention to the process whereby urban administration is decentralized in order to improve its outcomes. Therefore, the study aims to answer two main questions: How does the urban decentralized administrative system operate in the city of Amman? Has this operational system succeeded in achieving the city's urban development objectives?

In the first part, the study introduces the decentralized model through its forms, principles, and the legislative framework. In the second part of this research, the decentralized urban planning administration and management in Amman is traced, reviewed, compared and revised using the latest master plans: The Greater Amman Comprehensive and Development Plan (GACDP) of 1986, and The Amman Master Plan: Metropolitan Growth of 2008. Several methods are also applied to contextualize the research findings using the international literature, data published from a number of Jordanian public departments, and structured interviews conducted with planners from Greater Amman Municipality (GAM), the Sahab municipality, and random sampling of the local community.

Finally, using the case study method, this research evaluates one of Amman's peripheral satellite towns. Sahab has been announced as a satellite town in the latest Amman master plans. The research investigates whether the decentralized urban planning administration was a success

1 In his Garden City model, Ebenezer Howard introduced the concept of a satellite city in the late 19th century. Howard pushed the idea of building garden cities that were planned in advance, limited in size, and surrounded by a permanent belt of open space (Howard & Osborn, 1970). Initially, Garden Cities were designed to move people away from the slums and the smoke of industrial towns and into new, self-contained towns that were built in the open countryside, with industry intended to be located in the outer ring closer to transportation (Howard & Osborn, 1970).

or a failure in terms of urban development, by presenting in detail the administrative and spatial changes during the period 1986–2015.

3. URBAN DECENTRALIZATION IN THE MIDDLE EAST: AN OVERVIEW

For decades, the Middle East area has had firmly rooted centralized bureaucratic authority that has been directly reflected at the urban level. A number of problems are associated with such central urban management: insufficient urban facilities outside the city core, increased migration to big cities, slums around the city center, traffic jams, and pollution. Accordingly, the need for a paradigm shift toward adopting decentralized urban policies has become increasingly clear.

As a political model, decentralization aims to accelerate the urban development process by addressing, simplifying, providing and facilitating administrative procedures, public services, and policy-making. This holistic-sufficient approach attempts to reduce the financial burden on the government and eliminate bureaucratic procedures (Litvack et al. 1998, 4). In return, in their striving to achieve sustainable decentralized urban management, governments in the Middle East tend to be able to understand the broader vision of decentralized urban governance. Nevertheless, contextualizing the framework has been a crucial step (Shah 2006, 2). Depending on the political, social and economic context, a detailed holistic and consistence strategy should be carefully considered. Espousal of the general discourse of decentralization does not, however, imply a commonality regarding the steps whereby it is applied. Cities and their municipalities should have a systematic approach that is able to transfer authority within the government and empower the emerged local bodies (Shah 2006, 3).

The attempt to decentralize the Middle Eastern city structure has led to a complex turning point at the city planning level. In addition to the heritage of excessive centralization, the adaptation of such operational frameworks has encountered several obstacles on the administrative, financial and spatial level. These include an inadequate administrative system, unclear fiscal assignments, uncontrolled expansion, and the lack of revenue autonomy. All such factors have prevented a smooth transition to decentralized urban development in the Middle East. These obstacles have in turn generated a range of challenges—activating the assigned satellite towns, redistributing urban services and resources, and managing the land-use performance—which have caused difficulties for

cities' master plans and urban development strategies. Consequently, the political debate in the Middle East has shifted from whether decentralized urban development is good or not, to how the decentralization model can best be implemented. In the Middle East, the administrative process that prepares, controls and implements the urban development plans has caused alarm and concern, leading people to question its capability to achieve its objectives.

Moreover, the Global Report on Human Settlements (GRHS) 2009 identifies the failure of many urban development plans in the MENA region - Middle East and North Africa - as being due to urban management and implementation methods, rather than the limited content of their master plans and poor urban strategies themselves (Madbouly 2009, 14). According to the United Nations Development Program (UNDP) report 2004, statistics confirm that most Middle Eastern cities have not achieved their goal of attracting citizens from the dominant municipalities to the new urban nodes (UNDP 2004, 12; Madbouly 2009, 96). This means those cities are expanding spatially rather than growing, and in this case the expansion is not accompanied by adequate economic and administrative development.

4. THE SITUATION IN AMMAN

Amman is the capital city of Jordan, and the country's political, economic, and cultural center. According to the 2015 census, Amman currently has about 4 million inhabitants, or 42% of Jordan's total population (DoS, 2015). However, the built environment and the urban situation in Amman is complicated and dense, and the consequent excessive urban pressure on the Amman City core has brought the spatial structure to a dead end. The Jordanian government has started to implement a series of measures to achieve balanced urban growth, or at least alleviate regional economic and social disparities (Pottera et al. 2009, 82–83). One of the most important means of achieving this goal is adopting decentralized urban management.

4.1. Amman's Decentralized Urban Administration

Decentralized administration is of the utmost importance for Jordan's urban reform agenda. Based on solid legislative foundations, the Jordanian constitution has empowered the application of this model in a number of laws:

- The Municipalities Law, issued in 1955, still in force.
- The Village Administration Law No. 5, in 1954, still in force.
- The Law of Organizing Cities, Villages and Buildings No. 79, of 1966 and its amendments.
- Planning Law No. 68, in 1971, still in force.
- Investment Promotion Law.
- Jordan Rural Electrification Law.

Jordan has also taken important practical steps to implement decentralization. Following the international trend, three forms of decentralized administration have been established during the process of restructuring the decision-making authority in Jordan:

- **Devolution:** this can be realized through the three levels of local administration: the municipalities, the village councils, and the common service councils (MMA, 2015, and SOFRECO 2010, 6–8). Based on the national agenda, the government devolves functions and transfers authority for decision-making, finance, and management to quasi-autonomous units of local government, municipalities, village councils, or common service councils. In theory, these local governments elect their own mayors and council members and have defined and recognized geographical boundaries. Additionally, local governments raise their own revenues and have independent authority to make investment decisions (MMA, 2015; SOFRECO 2010, 6–8). However, in practice, Amman municipality has dominated the financial allocations and the urban development priority.

- **Delegation:** through this form of decentralization, central governments transfer responsibility for decision-making and administration of public functions to civil society organizations or community-based organizations. These organizations are not controlled by the central government, but are ultimately accountable to it (WBG, 2001). In Jordan, there are around 40 semi-autonomous public initiatives through which the central government can transfer its decision-making and administrative responsibilities to state-owned initiatives under indirect control of the central government (Jeraybeh 2014, 16–17). Yet, only one initiative in Amman, Harra Initiative, is registered as a neighborhood upgrading initiative serving the urban level. This indicates that the planning system is dominated by top-down practices and emphasizes the absence of integration strategies and the bottom-up approach in Jordan.

- **Deconcentration:** even though this is the weakest form of decentralized administration, it is the most common and frequently used in Jordan, and in Amman specifically. Amman municipality usually distributes decision-making authority and financial and management responsibilities among different levels of its central government (GAM, 2008). In this vein, Amman municipality has adopted a two-tier administration system in its master plans. The capital level is responsible for the whole urban planning process of Greater Amman Municipality, while the administrative level has a signed budget and limited mandate for issuing construction permits. Yet, according to this system, the administrative (i.e. district) level is still subsumed beneath a centralized authority and advisory body, the capital (GAM, 2008). Such a concept of controlled authority implies a strict centralized policy rather than the development of decentralization. It has also enforced an administrative control on land use through the requirement for GAM approval on all the urban actions within the amended zoning limits of Amman (Tewfik & Amr 2015, 56).

The limited and contradictory implementation of decentralization in Amman's urban development policy has negatively affected the generated urban form outside the city core. Correspondingly, this has given rise to debate on the theoretical appropriateness of the term 'decentralization' and the strategy's empirical efficacy.

4.2. Reading of Amman Master Plans

Unexpected population growth, the absence of administrative coordination between local authorities, and the lack of consistent laws and by-laws have often impeded urban growth and city development in Jordan's cities in general, and in the capital in particular (Tewfik & Amr 2015, 55). Nonetheless, through its short modern history (1920s), the city of Amman has witnessed many attempts to adopt decentralized urban development plans to enhance and control the city growth. This trend is especially pronounced in the latest plans: the comprehensive plan of 1986, and the master plan of 2008.

The Greater Amman Comprehensive Development Plan (GACDP) 1986 brought for the first time the concept of Greater Amman, which presents a new urban scale that was never known before 1986 (Malkawi & Abu Dayyeh 2004, 2). Thus, the city area had expanded

suddenly from 172 km^2 to more than 700 km^2, by adding adjacent municipalities to Amman municipality boundary, preparing the city to accommodate a population of 2 million by the year 2005 (GACDP, 1986).

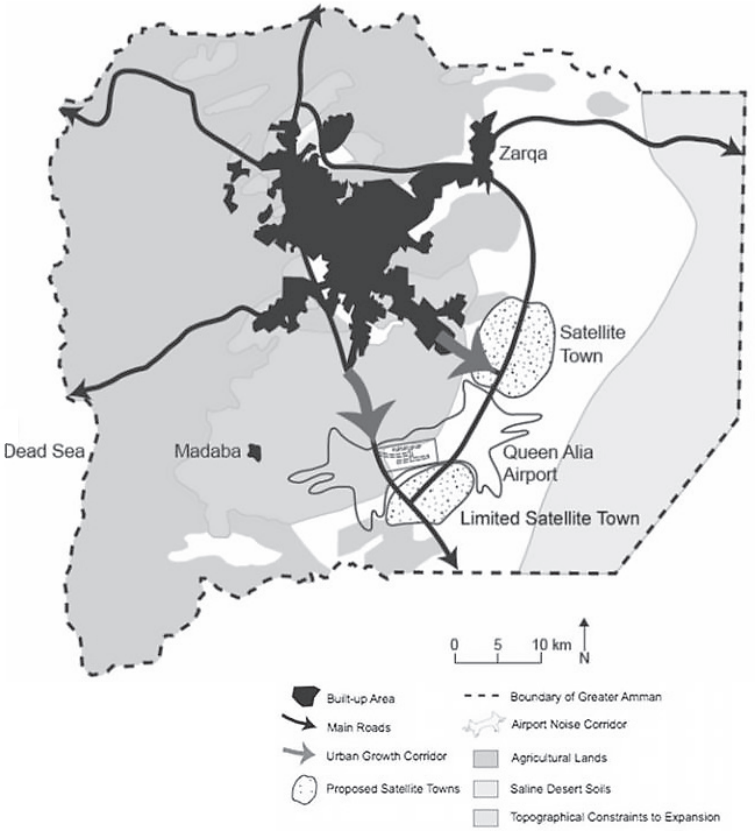

Figure 1: The Greater Amman Comprehensive Development Plan (GACDP) 1986-2005. (GACDP, 1986).

The next turning point in Amman's urban development was in Amman Master Plan 2008: Metropolitan Growth 2025. In this master plan, the concept of metropolis was introduced. Consequently, neighboring municipalities were annexed to Amman municipality, covering an area approximately 62.2% greater than that before expansion (GAM, 2008). In this metropolitan growth, Amman is projected to accommodate over 6 million citizens by 2025 (GAM, 2008).

Figure 2: The Amman Master Plan: Metropolitan Growth 2008-2025 (GAM, 2008).

In both plans, Amman applied a two-tier system in order to rearrange the administration issues between the central municipality of Amman and its new districts (Malkawi & Abu Dayyeh 2004, 6). The theoretical aim has been to achieve decentralization of administration management.

The deconcentration form of decentralized administration usually starts by annexing the peripheral municipalities around Amman's municipality boundaries. According to the two-tier system, these annexed municipalities become districts controlled and supervised by the central administration and the relevant fiscal body. This procedure has created several difficulties, since the new districts always have to compete with much more developed, dense and valuable areas in terms of urban development and investment. Predictably, the administrative challenges that emerged during the GACDP 1986 period were for the most part the challenges that were emphasized in the following master plan. However, the central authority's response to them did not vary in any significant way.

Despite the 22 years between them, the two above cited master plans closely resemble the decentralized urban management and growth around the GAM, and can be summarized as follows:

- Establishing a satellite town on the southeast edge of Amman linked to the city core by an outer ring road, in order to direct the spillover towards the proposed satellite town.
- Establishing a green belt around the city center to navigate the urban densification processes recurring within the proposed areas.
- Enhancing the decentralization discourse on the administrative level by applying the two-tier system in urban management.

4.2.1. Sahab District; the Satellite Town

Located in the southeast of Amman, the Sahab district has been proposed as a satellite town in both Amman master plans, as a part of the decentralization efforts in the area. The analysis of the selected case study, Sahab, would be a clear indication of the applicability of the decentralized urban planning process on the spatial and administrative level in order to answer the research questions.

Figure 3: Sahab District (GAM, 2008)

In the GACDP of 1986 and linked by a new outer ring road, the boundaries of Amman had expanded and the Sahab municipality had been annexed to join the Amman municipality. With its 39 thousand inhabitants (DoS, 1985), Sahab was announced as a satellite town in the southeast region of Amman, forming a new urban node in order to direct the spatial and industrial growth outside the city core (GACDP 1986).

However, the absence of any genuine co-operation between Amman's central authority and its districts, the deviation from the proposed urban development projects, and the lack of an effective mechanism to regulate the spatial growth of the industrial zones have entangled urban development strategies in Sahab. As a result, the burden on the central urban administration has been increased, instead of redistributed. Five years later, in 1991, and only after the end of phase one of the GACDP of 1986, the Sahab district was again declared an independent municipality (Pottera et al. 2009, 90). The key reason for such separation was the failure on the administrative level.

Amman Master Plan 2008 adopted the same decentralized administration framework, forming a central administrative authority charged with organizing and controlling the planning of the whole capital under one policy. Similarly, another adjustment of Amman's boundaries again included Sahab under its umbrella as a satellite town. The aim remains the same: to find a semi-autonomous industrial center that can release the heavy load imposed on the city core. Simultaneously, the new master plan proposed a new ring road on the southeast edge. Meanwhile, Sahab would be surrounded by two ring roads, from the northwest, constructed in 1986, and the southeast edge, constructed 2008.

Nonetheless, the social, spatial and administrative characteristics of the Sahab municipality have undergone marked transformation since the GACDP of 1986. The district has witnessed random spatial growth associated with poor physical and administrative changes (Tewfik & Amr 2015, 62-66). In 2008, Sahab had a population of almost 70,000 in 12km2 (DoS 2015); by 2015, it was estimated at approximately 170,000 within the same boundary, 12 km2 (DoS, 2015). Yet the urban services in this growing satellite town are gradually declining. Despite the attempts to establish Sahab as an urban node throughout these years, the provision of urban services has steadily deteriorated: one bus station, one public hospital, two medical centers, two public open spaces (DoS, 2014). The main report of the Amman Master Plan 2008 promised to improve the settlement's conditions and the urban infrastructure, and to intensify the spatial growth within the built-up areas toward the southeast and within the first two phases of the master plan, 2008–2018

(GAM, 2008). However, the decentralized administration model that has been operating these strategies followed the old steps of the GACDP of 1986, with entirely predictable results.

The phase one (2008–2013) evaluation report illustrates that, on the spatial level, an increasing number of industrial and residential building licenses have been issued, as a result encroaching toward the green belt of Amman to the north-west, leaving the assigned urban node behind, for a second time. On the administrative level, the evaluation report shows that 88.1% of Sahab district employees prefer to work under a separate independent administration rather being connected with the GAM central authority (GAM, 2014). In addition, 79.3% of Sahab inhabitants are not satisfied with the urban services provided in their area when comparing them to other districts of Amman (GAM, 2014).

In summary, the practiced urban policies clearly indicate a failure to achieve self-sufficiency within the generating urban node. Consequently, scattered industries and random commercial and residential structures have mushroomed on both sides of the highway (Tewfik & Amr 2015, 62–66).

4.3. The Decentralized Urban Administration Challenges in Jordan

Jordan has taken important steps in implementing decentralized urban management. Nevertheless, the city–state concept and the complex-centralized urban cluster in Amman have prevented this model from functioning effectively. Instead, a strict centralized policy, polarization, and incompatible and fluctuating urban development in different parts of the city have emerged, creating a critical relationship between the city core and its peripheral satellite towns.

Accordingly, based on the previous analysis of the Sahab district in the GACDP of 1986 and Amman Master Plan 2008, the challenges of the decentralized urban administration can be identified as the following:

- Political decentralization and local governance, including the application of the two-tier system.
- The insufficient financial resources assigned to the proposed satellite town.
- The changeable municipal border demarcation, by annexing peripheral municipalities and villages to Greater Amman Municipality at the beginning of the master plan, then allowing them to separate.

- The administrative division of annexed municipalities after joining Amman and the absence of restructuring and integration plans for these new districts.
- The conflict of interests among the district authorities with regards to priority setting.
- The existing dispersed individual properties. (See Tewfik and Amr, 2014; *Arbitrary Land Use Policy in Jordan between Legal Brand and Property Control*)

Thus, as a first step, it is necessary to identify and diagnose the weaknesses that have appeared in order to achieve a better decentralized urban planning system.

5. CONCLUSIONS

The concept of decentralized urban development is profound, transformational, and long-term. Once achieved, it will lead to a wider and healthier perspective regarding city growth and management. However, the decentralized urban planning policy is not an end in itself; it cannot on its own guarantee the achievement of proper transformational urban development. It is however an essential tool for promoting and supporting the process.

In the case of Amman, the method has been limited by the application of the model of annexing the peripheral municipalities to Amman's boundaries. Additionally, the two-tier system has also been incapable of achieving urban goals, since it has been managing and controlling these districts without any considerations of the financial, administrative, spatial, and social contexts pertaining. Ideally, these attempts have intended to alleviate the supremacy of Amman as a sole growth center (GACDP, 1986; Abu-Dayyeh 2004, 81). Nonetheless, such attempts have, on the one hand, caused further domination of the city core and correspondingly, on the other, the proposed satellite town, Sahab, has been falling behind in urban development.

In conclusion, the forms and the practices whereby Amman's administration has been decentralized have failed to achieve the urban development ends of controlling and organizing the futuristic urban growth phases. The latest master plan, Amman Master Plan 2008, has simply reformulated most of the spatial and administrative strategies that were previously spelled out in the 1986 plan.

Coupled with the failure to achieve its aims, the imperfect

implementation of both plans with regards to the proposed urban node has worsened the fragile urban fabric in Sahab. As a result, a scattered sprawl of settlements, especially after constructing the second ring road, has emerged with neither specific urban form nor spatial identity.

Therefore, the study calls for the following to be considered:

- A successful decentralization depends on institution-specific design (Litvack et al. 1998). Therefore, if annexing adjacent municipalities is the only solution for city expansion, Greater Amman Municipality must develop a new integrated and realistic plan that can to some extent ensure and facilitate this new administration system in a way that can reach the urban objectives mentioned in the master plan.
- Adjust and contextualize the borrowed decentralization by upgrading the administrative frameworks at the new urban nodes, rearranging the district limits and redistributing the financial allocations for each district.
- Reconsider the two-tier system and implement urban development programs in ways that are nationally oriented, and that develop strategic capacities at the new urban nodes.
- Enhance the transparency, accountability, and the flow of information between Amman's districts.
- Understand institutional procedures, legal and administration system, practices and norms in the city.
- People and institutions must be empowered by involving the government, the private sector and civil society to create a comprehensive vision for the city development.

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(In)formal Urban Mobility as an Urban Regeneration Tool. The case of the Almendral neighborhood hills in Valparaíso, Chile

Marcela Soto C.
Jorge León C.

ABSTRACT

Urban mobility has always been studied in urban development matters. As cities experience the growth of large informal settlements – commonly isolated and segregated – urban mobility becomes essential to integrate the population by allowing open access to different parts of the city. Transport planning is therefore usually a top-priority agenda item for authorities; however, in third-world cities it is common for operations to extend beyond the planned limits. While the public transport system is often disorganized and little regulated, a wide-ranging informal transport system emerges mostly to serve areas left unserved by formal public transport. By seeing urban regeneration as an urban transformation process that allows social inclusion and better quality of life, this investigation aims to evaluate urban mobility (both formal and informal) as an urban regeneration tool based on a case study of the Almendral neighborhood hills in Valparaíso, Chile. In this paper we explore the concept of Transport-City Synergy as a way of regenerating a city, which at the same time allows current development and planning patterns to be reevaluated. Finally, an urban mobility and connectivity analysis of the sector is carried out. As a result, an efficient and semi-informal public transport system is identified, which influences the consolidation of informal neighborhoods on the outskirts of the city.

Keywords: urban mobility; urban regeneration; informal transport.

1. INTRODUCTION

Globalization has caused an intense expansion of cities' networks and flows – reflected in consumption of space, time, energy and financial resources – deeply affecting urban development. Current urban expansion fosters a model of mobility based on the automobile, which is expensive, unequal in terms of opportunity distribution, and environmentally unsustainable (Calatayud et al., 2006). Furthermore, urban sprawl often accentuates the characteristic problems of Latin American cities such as social segregation, difficult access to employment for the most disadvantaged groups and the geological vulnerability of some urbanized zones (De Mattos, 2002). In addition, urban fragmentation is accentuated in several Latin American metropolises due to their complex topography and monocentric development models, in which services and administration are highly centralized in limited flat, low-lying areas (Soto and Álvarez, 2012). Therefore, social differentiation of space has been reflected in a spatial organization based on the center-periphery opposition. In consequence, poor housing is frequently located on the periphery of the metropolis and is usually isolated due to deficient connectivity. In this scenario urban mobility plays an important role in the process of urban regeneration in terms of the integration of citizens into downtowns, social inclusion and better quality of life.

Given the above, the need for adequate pedestrian mobility and an efficient public transport system is extremely relevant: on the one hand, they provide accessibility and connectivity to the entire population, mainly those groups in more disadvantaged areas of cities. On the other hand, they mitigate the problems associated with the increased use of private transport. While transport planning is usually a top-priority agenda item for authorities, in third-world cities it is common for operations to extend beyond the planned limits, as there are incentives to take advantage of fragmented transport systems that are often disorganized and little regulated. In this way, the state-authorized public transport operations can become precursors to the informal urban transport sector (Gwilliam, 2002).

Informal transport can be defined as that which operates outside of established transport regulations (UITP, 2009). It benefits consumers as it can fluidly adapt to demand and easily change schedules, routes and operational practices in response to the ever-evolving conditions of the consumer. Therefore, informal operators are more likely to create new services in response to increased demand for public transport within an urban area (Cervero 2000, 52-54).

The authorities in developing countries, where the use of informal public transport in cities is intensive (as it complements the deficiencies of formal transport), are reluctant to eradicate or regulate it. However, as many authors point out (Cervero, 2000, 76-81; Salazar et al. 2015), its regulation is increasingly necessary due to its negative consequences such as increased traffic and its environmental impact, disorganized operations, unfair practices and unsafe and unpredictable service, among others. Thus, in this paper, the concept of an informal transport system will be understood as that which operates without legal status or is prone to alter its basic operating conditions such as routes, schedules and rates if it operates legally.

Given the need for a connectivity model capable of providing conditions of equity and coexistence in the city, a review of the Transport-City Synergy spatial relationship (Miralles Guash, 2002; Herce and Magrinyà, 2013), as a reciprocal vision established between the transport system and the economic (services) and social distribution of the population within the urban area. Under this scope, we need a reevaluation of the current public transport system and its possible informal operations. Based on a case study of the Almendral neighborhood hills in the city of Valparaíso, the focus of this investigation is to evaluate urban mobility as an urban regeneration tool within complex topographical contexts. To this end, a spatial analysis based on public ways for pedestrian mobility and public transport (both formal and informal) is carried out. In addition, the investigation includes an analysis that can be extrapolated to similar contexts. Hence, this methodology will allow future researchers to identify both informal transport networks and their impacts on urban structures in areas of complex topography, as they exist in several Latin American cities.

This investigation is organized as follows: Section 2 lays out the theoretical framework in two subsections. The first subsection introduces the relevance of urban mobility in urban regeneration processes and the Transport-City Synergy concept. The second describes the sector under analysis, whose geography is a hodgepodge of both formal and informal neighborhoods. The third section presents the methodology of the analysis of mobility in the sector, using the time required for pedestrians to access public transport networks, complemented with an inventory of public and state projects and public facilities. The fourth section presents the results, hard data and analyses that seek to establish a Transport-City Synergy relationship in urban regeneration processes. Finally, the fifth section offers conclusions that not only deepen the discussion, but also reveal new issues related to this research that will serve as the bases for

future investigations.

2. BACKGROUND

2.1. Urban mobility as an urban regeneration tool

Urban regeneration (UR) is a term that generally describes the field of public policy that deals with a series of economic, social, physical, environmental and fiscal problems within the complexities of a city (Aparicio and Di Nani 2011, 23-45). It is also defined by many dictionaries as "the process of slum clearance and physical redevelopment of an urban area" (Couch et al. 2011, 3). Although no universal definition of UR yet exists, it might be considered as a response to opportunities and challenges posed by urban degeneration in a particular place at a specific moment in time. While some types of UR policies are carried out in central areas of high historical value in degradation, as in many European cities (see, for instance, Couch et al., 2011), others can be enacted in marginalized/disadvantaged areas, as is often the case on the periphery of Latin American metropolitan areas (see, for instance, Vásquez, 2014). While these types of UR take place in different contexts, both are related to the creation of significant synergies when intervening in disadvantaged areas.

Given the above, it is possible to affirm that UR seeks the development of degraded urban areas and enhancement of overall quality of life for its inhabitants. To this end, urban mobility becomes a priority since a lack of access to transport contributes significantly to exclusion from the labor market, services and social relations (Pooley, 2016). Urban mobility, understood here as the set of different movements that occur within a city, acts as the builder of everyday urban life and contributes to its structure while interplaying with land use patterns, infrastructure works and the natural environment, among other factors. In this way, the issue of mobility becomes essential for all cities considering that "mobility allows the interaction of people and the trading of goods, two defining elements of the reasons for the very existence of cities" (Macário 2011, xviii). Related to this idea, some authors (see, for instance, Miralles-Guash 2002, 27-31) have argued that the inclusion, integration and cohesion of urban settlements is measured by the equal opportunities to participate in life in the city created by allowing all people access to different parts of it. Therefore, urban mobility emerges as a fundamental pillar for generating UR in disadvantaged areas, known mainly as informal neighborhoods in Latin America. These informal areas are usually unplanned, with low coverage by urban facilities, lack of public spaces and poor connectivity.

While informal settlements usually occupy neighborhoods with significant poverty rates, they are highly likely to evolve into consolidated urban areas. In this transformation process the transport system usually plays an important role: as Miralles-Guash (2002, 11-12) suggests, urban transport is not just an introduced technical element, but rather – in itself – a social construction. Several authors (Gutiérrez, 2010; Miralles-Guasch, 2002; Zahavi, 1980) analyze the dialectic of city and transport and how they interact, influence one another and evolve together over time. In this respect, early 19th-century analyses review urban transport as a technical element resulting from a cause, or the effect of city development and vice versa. Moving beyond this causality paradigm, the Transport-City Synergy analytical exploration emerged at the beginning of the 1970s. In this approach, the analysis of such an indisputable and complex relationship includes a profound understanding of the territorial dynamics into which transport modes insert themselves and the relevance of urban mobility.

Some authors proposed the structural congruence approach (Offner in Miralles-Guash, 2002, 18-20), with the idea of correlating structural dynamics (economic, social and cultural) and transport and territorial strategies. In this theoretical context, the relationship between transportation modes and the socioeconomic organization of the space is formalized in a broader structural coherence. The concept of Transport-City Synergy is a reciprocal influence established between the transport system and the economic and social distribution within the urban area. Within this context, it is important to consider the Transport-City Synergy concept in a probing analysis of mobility in these urban regeneration processes. While keeping in mind the complex topographical characteristics of the study area in Valparaíso, it is imperative to identify the degree to which urban mobility has influenced the consolidation of informal neighborhoods. As a consequence, the need to study and identify this relationship stems from its relevance in terms of urban mobility and urban regeneration.

2.2. Study area

Valparaíso is a coastal city of 263,499 inhabitants (2002 Census) that is located in central Chile, 110 km west of the capital city, Santiago. It is the historical center and urban core of the Valparaíso Metropolitan Area[1] (AMV for its acronym in Spanish). One unique characteristic of this city is its geography, which has the shape of a large natural amphitheater set along a bay of the same name and surrounded by hills that are home to almost 90% of the port city's population (Sánchez et al., 2009).

The Almendral neighborhood hills (located to the east of the city's historic downtown) cover an area of about 9.7 km2 and have a population of 53,217 (2002 Census). The hills were first populated in the mid-19th century, when the slow-growing port town (typical of the Spanish colonial period) became a spontaneously growing city after independence and the onset of free trade (Memoria chilena, 2003). In this way, the city's physiognomy was drastically transformed. Different urban areas developed according to the city's natural physical characteristics: in the lower-lying zones, foreign merchants set up shops and urban consolidation rapidly took place, as evidenced by public works and services; meanwhile, when the "plan"[2] became too expensive and densely occupied, lower-income social groups moved into the hills (Sánchez et al., 2009).

As Urbina (2002) suggests, a large part of the city's population growth was precariously absorbed by unconsolidated hills. Unsanitary types of housing such as ranches, round rooms and tenements were erected along convoluted, unpaved streets with no urban services. Thus, even at that time (mid-19th century) there was a clear distinction between the consolidated city (the plan) and the irregular city of the hills (León, 2013).

Topographically speaking, the Almendral neighborhood hills extend from the level of the city plan up to approximately 450 m.a.s.l. This topography is characterized by three distinct terraces at 40, 110 and 200 m.a.s.l. (Figure 1), created by marine abrasion eons ago, which periodically present deep ravines. These geomorphological conditions create abrupt and irregular variations in the terrain slope, which impact building characteristics, accessibility and property divisions.

The structuring and consolidation of urban space in Valparaíso's hills were boosted due to urban infrastructure development undertaken at the beginning of 20th century. In this hygienist period of the city, large underground rainwater pipelines were built, running from hills to sea, preventing floods and landslides and subsequently transforming into the great avenues of the city. Unlike this large-scale consolidation operation, in many areas of the hills spontaneous expansion always preceded

1 The Valparaíso Metropolitan Area (AMV) is made up of the municipalities of Valparaíso, Viña del Mar, Quilpué, Villa Alemana and Concón. With nearly 900,000 inhabitants, it represents 51% of the region's population and covers the majority of the Valparaíso and Marga Marga provinces (DTPR, 2014).

2 The plan is the popular way of referring to the flat, coastal strip of land between the coastline and the hills.

regulations, authorities' decisions, plans and facilities, which frequently attempt to regulate urban growth that was already in place, years or decades after processes have been consolidated. Therefore, from the point of view of urban planning, Valparaíso may be analyzed according to its particular status as a city that is *regulated* prior to being *planned* (León, 2013).

While some parts of Valparaíso's hills have been successfully consolidated, like those below Alemania Avenue at 100 m.a.s.l. (the only avenue that crosses all the hills, in a sinuous way), atomization and precariousness are still latent and persistent in the area. Since the 1970s, these slum neighborhoods have been known as *campamentos*.[3] This term essentially describes groups of homes that lack at least one of the basic services offered by urbanization and that are in an irregular situation in terms of land ownership (CIS, 2015). There are 19 *campamentos* in the Almendral hills, home to 790 families (CIS, 2015); they constitute what we would call informal neighborhoods. It is worth pointing out that today the identification and characterization of *campamentos* seeks not only to focus on living condition deficits, but also to investigate the characteristics of the families and the land as a physical space that presents both threats (unstable ground, vulnerability to natural disasters) and opportunities, as they could eventually evolve into consolidated urban areas (Secretaría Ejecutiva de Campamentos, 2013).

Thus, the sector under study currently includes both formally developed zones and informally developed zones with high poverty levels. In some of these areas there is a general deficit of urban services such as electricity, sanitation, public transport, paved roads, etc. These areas cannot be considered static (even given their precariousness), but rather are susceptible to progressive consolidation processes. Within this context, researching the degree to which mobility and public transport (especially that of an informal nature) could contribute to these regeneration processes – making reference to *Transport-City Synergy* – would clearly be valuable.

3 "*Asentamientos preferentemente urbanos, de más de ocho familias que habitan en posesión irregular un terreno, con carencia de al menos uno de los tres servicios básicos (electricidad, agua potable y sistema de alcantarillado) y cuyas viviendas se encuentran agrupadas y contiguas*" (Secretaría Ejecutiva de Campamentos, 2013). (Usually urban settlements of more than eight families who live, unregulated, on land not necessarily belonging to them. These settlements lack at least one of the three basic services (electricity, drinking water or a sewage system).

3. METHODOLOGY

As previously mentioned, the Almendral neighborhood hills provide an interesting object of study for this investigation because they present a complex topography, undoubtedly conditioning the existing urban mobility and structure in the area. Add to this the intuitive thought that increased connectivity would lead to the consolidation of informal neighborhoods and their urban regeneration by way of adequate mobility levels for their inhabitants and accessibility to the city, and thus higher quality of life. Related to this idea, the following research question is posed: *To what degree have urban mobility patterns (both formal and informal) influenced urban regeneration in disadvantaged zones of the Almendral neighborhood hills?*

3.1. Collection and processing of information

With the aim of focusing the analysis, an area of Valparaíso was specified for study: the Almendral neighborhood hills. Given its central location, history and topographical characteristics, this area is highly representative of current conditions throughout the city. Extensive study of it, therefore, ought to allow patterns and characteristics that can be extrapolated to the rest of the city to be understood.

In order to apply the Transport-City Synergy concept to the case study, an analysis of the sector's transport-related mobility first had to be conducted. The public transport system in the AMV breaks down in the following way: buses, collective (shared) taxis, trains, trolleys and funiculars. The greatest differences in these forms of transport are the ways in which they move, classifiable into two groups: those that follow fixed technical paths (MetroVal, trolleys and funiculars) and those that can (potentially) move freely across the road network (buses and collective taxis, the most popular mode of transport), allowing them to "irrigate" the city and its hills. Between these last two modes that serve in the study area, collective taxis are preferred over buses even though they offer neither student fares nor the large capacity of a bus. In this respect, it has been argued that small vehicles enjoy advantages over larger ones: they take less time to load and unload passengers, have higher frequencies and stop less often (Glaister, 1986). Add to this the complex topography that characterizes Valparaíso, and collective taxis are even more favorable than buses. Although the system is governed by the national decree DS 212 MTT[4] , which establishes regulations for certain

formal aspects, the specific regulation of the operational conditions of collective taxi transport is limited to minimum requirements (DTPR, 2014), making it a sector susceptible to informal practices.

Pedestrian access to public transport networks (those that serve the study area such as buses and collective taxi lines) was included in the analysis given that, first of all, it is considered by many researchers (Pozueta et al., 2009 and Talavera-Garcia, 2012, among them) to be the factor that unifies and integrates the different transport modes, public spaces and thus the capacity for human mobility. Second, there is a low level of individual transport in Valparaíso, which has a motorization rate of 0.17, compared to the national average of 0.25 (Observatorio Urbano MINVU, 2014). This makes the relationship between pedestrian accessibility and public transport networks indispensable to this study.

Information was simultaneously collected regarding the existence of state projects that include the construction and improvement of public pedestrian paths such as sidewalks, stairs, and passages, etc. (Figure 2), as well as urban facilities such as schools, preschools, neighborhood

Escalera Angamos, Cerro Monjas *Escalera J.A. Torres, Cerro Monjas*

Figures 1 and 2: State projects for improved urban mobility in the Almendral neighborhood hills. Source: the authors

4 The DS 212 is the Reglamento de los Servicios Nacionales de Transporte Público de Pasajeros (Regulation for the National Service of Public Transport for Passengers), which requires registration in the National Registry, establishing a description of a service's route, frequency and fares, among other factors (Ministry of Transport and Telecommunications, MTT-).

centers, health centers and public spaces as key generators of mobility. Distances between these facilities and the public transport network were measured, generating information that complemented this mobility study. Additionally, an empirical analysis of the sector's informal public transport practices and their relationship to the conditioning topography and urban regeneration were also considered. This analysis allowed us to go deeper in answering the aforementioned research question.

3.2. Description of computer-based analysis

The public transport to be studied was the existing network of eight bus lines and seven collective taxi lines, which were examined through secondary (Ministry of Transport, private companies) and primary sources (on-site verification, study with GPS). As previously mentioned,an inventory of public way improvement projects in the sector implemented by the "Quiero Mi Barrio"[5] Ministerial Program since the year 2014 was also made and relevant information on existing urban facilities was collected. All this data was mapped and georeferenced (see Figure 3) using ArcGis software and its Network Analyst extension, which offer analysis tools to solve complex network routing problems (Esri, 2013).

Once this information was included in the GIS maps, the times needed for pedestrians to access the public transport networks were estimated. To do so, the service areas of these transport lines were evaluated according to the walking time required to access them by way of the existing street network. The standard walking speed was considered to be 1.4 m/s (Daamen and Hoogendorn, 2005). As this study includes an urban area with varying terrain slopes, the speed conservation parameters established by Post et al. (2009) (Table 1) were used to modify this base walking speed, as pedestrians' pace can slow down depending on the slope of the street, allowing a more exact determination of mobility for the inhabitants of the Almendral neighborhood hills. Thus, making use of a maximum neighborhood distance of 600 meters[6] around each public transport line, walking times for accessibility were divided into two ranges: between 1 and 5 minutes and between 5 and 10 minutes, as

5 The Neighborhood Recovery Program "Quiero Mi Barrio" of the Ministry of Housing and Urban Development (MINVU, for its acronym in Spanish) consists of physical and social recovery at a neighborhood level, facilitating the linking of this neighborhood with its city (www.mnvu.cl).

Figure 3 demonstrates. Thus, the described methodology can be used in different urban areas with complex topographies (as is the case in several Latin American cities).

Slope (degrees)	Speed conservation (%)
0	100
0-5	90
0-15	80
15-30	40
30-45	15
More than 45	5

Table 1: Terrain slope and pedestrian speed conservation
Source: Post et al. (2009)

It was thereby possible to determine the walking time required to access the local public transport system. This also facilitated identification of areas with less connectivity or difficult access. It is worth pointing out that the research done in the field to collect information about the collective network served two purposes. It resulted in the mapping and identification of the routes and also allowed for an empirical analysis of the sector's informal practices, subsequently contributing to arguments related to the research question.

4. RESULTS AND DISCUSSION

The results of this study demonstrate that the Almendral neighborhood hills have a sufficiently complete and geographically well-distributed public transport system to provide high-coverage service, a fact that

6 In urban planning design, 600 meters is typically considered the limit for neighborhood dynamics. In other words, it is the distance the majority of people are willing to walk to engage in their daily activities (Ritchie and Thomas, 2009).

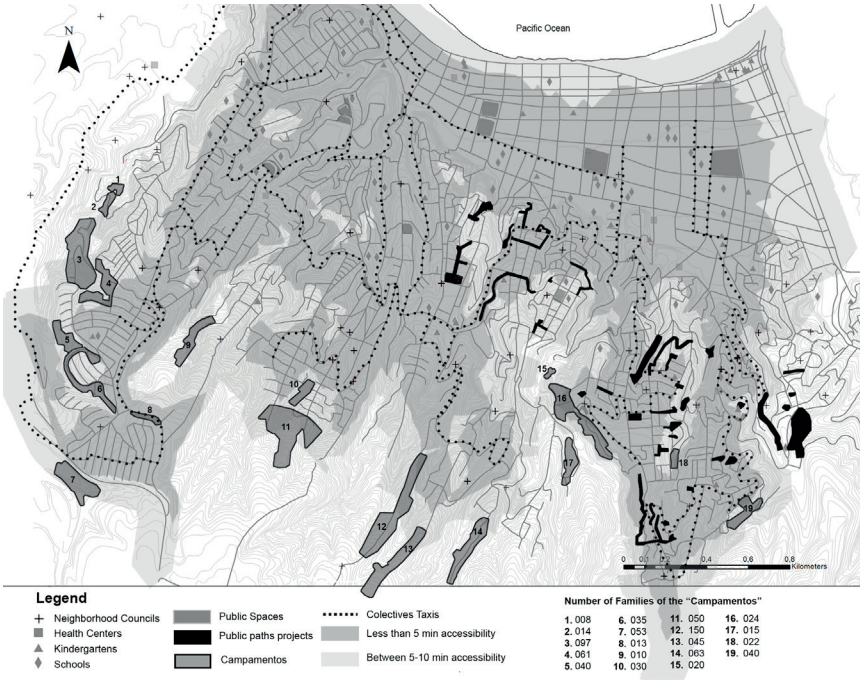

Figure 3: Pedestrian access to collective taxi network, public way projects, urban facilities and campamentos. Source: the authors

exceeds our expectations for the system. In terms of the level of pedestrian access to the public transport system, approximately 28.4 km of the urban street network system (21%) is located within a one-minute walk of a bus route and 112.9 km (87.9%) within a ten-minute walk. In terms of collective taxis, 30.9 km (24.1%) of the urban network is located within a one-minute walk and 118 km (92%) within a ten-minute walk. In terms of population, the public transport system (within a ten-minute walk) serves 91.3% of the total population of the study area according to the 2002 census (the last valid census in Chile). The study also revealed the existence of 35 state projects, of which 5 have been implemented, under the Quiero Mi Barrio program. These projects include approximately 3,782m² of public way and public space improvements, most of which are located in the eastern part of the study area, which was affected by catastrophic forest fires in 2014 (Reszka and Fuentes, 2015). In addition, 96 urban facilities in the sector (preschools, elementary and high schools, neighborhood centers and health centers) were surveyed. Of these, 32 (33%) are located

within a one-minute walk of a collective taxi route, while 95 (98.9%) are within a ten-minute walk. Of the 19 campamentos in the sector, only six (1, 2, 11, 13, 14 and 17) required more than a ten-minute walk to access the public transport system.

Both transport modes' operations are significantly determined by the topography of the Almendral neighborhood hills, which have average slopes of approximately 10%. The sector's buses reach an average speed of approximately 19 km/hour, while the taxis' average speed is 21 km/hour. For this reason, the collective taxis' travel time to reach Cintura Road (100 m. a. s. l.) and the city limits (+450 m.a.s.l.) is half that of the buses. Thus, this system offers efficient connectivity between the hills and the plan, allowing the Almendral sector (including its services and commercial urban core) to be connected to the highest parts of the city in less than 15 minutes. However, the hill-to-hill transverse connectivity is inadequate due to a lack of infrastructure to overcome the complex topography.

In terms of fares, a bus ride costs $0.74 USD and a collective taxi ride $1.29 USD. These fares are equivalent to 0.2% and 0.3% of the minimum income in Chile, respectively. Although these prices are affordable for the larger population, on occasion (mostly at night) they are arbitrarily raised by the drivers. In this respect, during the field analysis, the collective taxi network demonstrated a certain degree of flexibility. The lack of regularization and structure of the system (also characterized by a high level of property atomization) allows the operators of these services to change their routes and frequency of service, making it an unreliable system. Nonetheless, these vehicles have advantages, including quicker arrival times and better management of steep slopes and the narrow, complex streets typical of the sector, creating a situation that allows this system to be open to informally determined trip departure points in the Almendral neighborhood hills, offering the required mobility in a sector with a low level of private, individual transport.

This point provokes discussion about the kind of city regeneration underway, which is subsequently regulated rather than planned, and public transport's level of influence on its development. In this sense, the passive role of the authorities when faced with these informal practices suggests a system that functions within a laissez-faire context. According to Cervero (2000), the flexibility of operations in such a context is the result of their being viewed as a necessary evil. However, this irregularity, as it stands, also complicates planning and control of the area and subsequently the quality and safety of public transport, a basic service that is essential to urban regeneration.

5. CONCLUSIONS

While globalization continues to push forward, mobilization, urban structures and the city itself ought to be analyzed as a dynamic body, where urban regeneration processes make clear the correlation between transport and city, two concepts that evolve together. Thus, the idea of an efficient transport system is cast as the result of urban space system integration and connectivity, and consequently urban regeneration. Therefore, as per the case study, in spite of the existence of informal practices in the system, it allows for the inclusion of Valparaíso's most marginalized, peripheral neighborhoods and contributes to their eventual consolidation. While this system offers a practical and affordable solution to the most vulnerable members of the population, the lack of prior planning greatly affects the area's urban development. In this respect, the fragmented nature of the governmental interventions and the site's complex topographic conditions (affecting the great majority of homes in the area, often exacerbating their vulnerability, especially in the event of natural disasters) are just two of the negative external factors that have contributed to urban planning vacuums in the city of Valparaíso.

For this reason, it is essential to consider the context within which informal transport develops due to *Transport-City Synergy,* in which the fragmentation of urban structures and the consumption of time and energy play important roles. This investigation made use of the methods applied in contexts with complex topography (as is the case of Valparaíso) where public transport was identified as semi-informal in nature. This term was used to emphasize that it is a system that engages in informal practices (such as alterations of routes and fares) but operates under a legal framework. In this way, we can differentiate it from an informal transport system that includes both informal operations under legal frameworks and outside the law. After carrying out this investigation we can affirm that although the informality of its operations is not absolute (as it is in systems that operate outside legal frameworks), collective taxis engage in various operational alterations daily given the high degree of flexibility in the regulation of the system, as confirmed by our research in the field. Despite the fact that this semi-informality is technically legal, it is evidence of the lack of regulation in the case study area.

This investigation therefore opens a discussion that can be further developed in future studies. Some of the many resulting research questions include, among others: if Valparaíso's semi-informal transport system benefits informal city neighborhoods, do the authorities see it as a necessary evil? How can this system be regulated without jeopardizing

the mobility of people in the most vulnerable neighborhoods? Could its regulation contribute to a decrease in settlements in Valparaíso's informal neighborhoods?

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Structural Causes of Unsuccessful Urban Regeneration: The Case of Renovation of Atabak Neighborhood in Tehran, Iran

Elnaz Naseri
Behrouz Safari

ABSTRACT

Contradictory forces in urban processes can lead to unstructured, disordered and chaotic forms of urban fabrics. One of the main physical expressions of this chaos could be seen in the prevalence of deteriorated urban fabrics. Whereas the chaos is not limited to physical aspects, any attempt to deal with this problem requires a comprehensive and integrated package without contradictory components. According to the chaos theory, what makes a system chaotic is the incoordination among the differentiated structures because of the exogenous forces. This theoretical approach has been used in this research in the evaluation of the renovation of deteriorated fabrics of Atabak Neighborhood, a disadvantaged neighborhood with a vast physical and social degradation in Tehran, Iran. The renovation plan was launched by the Urban Renewal Organization of Tehran (URO) in 2006 as the first participatory renewal plan in deteriorated urban fabrics of this city, but it was put aside in 2009 leaving behind an unsuccessful experience with negative consequences. Using the official documents of the plan, statistical data from the surveys, the national census and interviews with the facilitators of the project, we have analyzed the causes of the failure of this experience according to our theoretical framework. The results show that the major cause of the unsuccessful urban regeneration is due to the negligence of structural nature of the phenomena in the plan which did not come to institutionalize the process of this regeneration. This negligence has led to not considering the transversal nature of urban regeneration and the lack of coordination between different organizations, non-sustainable financing, mistrust in governmental and municipal agencies intensified by sequential changes in the administration, noninstitutionalized social participation of the residents, exogenous nature of intervention by prioritizing the spatial-physical instead of the social aspects.

Keywords: urban regeneration, deteriorated fabrics, chaos, unstructured planning

1. INTRODUCTION

Tehran was a very small city when it became Iran's capital on 12 March 1786 (Hambly 1991, 118). Since then, social, economic and political changes and the centralist political structure in Iran, have transformed this city into a huge metropolis with 8.7 million inhabitants (Statistical Center of Iran 2016). The ambitious development programs of different governments – especially the land reform program of 1963 – led to massive migrations from villages to cities, from small cities to large cities, and finally to Tehran. But along with this rapid urban growth, concentration of the population and vast new constructions on empty land, the old central fabrics of the city have gone through a continuous process of degradation. Now, according to official statistics, 3268 hectares of the city of Tehran are considered deteriorated fabrics which encompassed 1,152,173 inhabitants or 15% of the population in 2006. According to the official definition, the deteriorated urban fabrics are those urban fabrics which include unstable, small and impenetrable buildings at the same time (Tehran Municipality 2006).

A common study was conducted in March 1999 by Centre for Earthquake and Environmental Studies of Tehran (CEST) and Japan International Cooperation Agency (JICA) to estimate the amount of vulnerability of urban fabrics of Tehran against earthquakes. The results showed that an earthquake with the magnitude of 6.7 Mw due to the activation of the southern fault of Tehran can lead to a catastrophic situation killing 383,000 and the destruction of 55% of the buildings. If the earthquake takes place at night and without the possibility of rescue operations, District 15 of Tehran – which encompasses the Atabak Neighborhood – would take the heaviest casualty toll of more than 50,000 (JICA & CEST 2000, 180). In fact, what would make a mega disaster from a natural phenomenon would be the presence of vast deteriorated urban fabrics in Tehran with unstable buildings and impenetrable fabrics which highly limits all kinds of rescue operations.

However, the problem is not limited to physical and natural aspects. For decades, the residence patterns in Tehran have been formed such that the upper classes have occupied the northern areas, and the lower classes have been settled in central and southern neighborhoods which include almost all of the deteriorated fabrics. In the recent years, the neoliberal policies, the government's disengagement from the housing market and different forms of gentrification have enriched this polarization and intensified the urban poverty. Consequently, many residents who had lived for a long time in central and southern

neighborhoods were obliged to leave Tehran to dwell in the margins of the city, which is known as the informal settlement (Khatam 2013).

On the other hand, because of the capitalistic and automobile-based urbanism model, Tehran suffered from pollution and congestion problems. But instead of revising its own policies, Tehran Municipality decided to cope with these problems by constructing new highways. The idea considered highway construction as a panacea for renovating deteriorated urban fabrics. In the 1990s, Navab Highway was constructed passing through the old Navab Neighborhood. The adverse consequence of this project was a high displacement of the neighborhood population. Today, this occurrence is remembered as a complete failure (Bahrainy & Aminzadeh 2007, 121). The widespread criticism of Navab Renovation Project and the literature on sustainable development persuaded the new administration of URO in 2005 to take a new approach toward renovation plans. At this time there was a renovation plan for the Atabak Neighborhood which included a new highway. Although unlike the experience in Navab Neighborhood, which is referred to as Navab Experience in this paper, some aspects such as the participation of inhabitants have been taken into account in this plan, the result, in practice, was another failure. Other studies on the ineffectiveness of urban regeneration projects in Iran have mentioned different items as major causes of failure. For example, some studies emphasize on the Municipality's policy of selling surplus building density as the root cause of failure (Azizi 2014, 60). But in this paper, our argument is that the failure of the Atabak Renovation Plan is rooted in the absence of a basic epistemological and philosophical foundation in all of the urban regeneration plans in Iran, which, according to chaos theory, is rooted in lack of structuration. For this reason, after introducing our methodology, we will present our theoretical framework, and then, we will review the urban renovation experiences in Tehran and in the Atabak Neighborhood; finally, we will investigate the structural causes of the failure of the Atabak Renovation Plan.

2. DATA AND METHOD

Since the main objective of the current study is to find structural causes of failure of the Atabak Renovation Plan, we will not evaluate all the other aspects of deficiencies in the plan. Those elements in planning and implementation which are considered the root causes of failure according to our theoretical framework will be studied. Our critique to the Atabak Renovation Plan is, foremost, epistemological. So, this study can be

considered as fundamental research. Our second objective is to criticize the methods applied in the renovation program, so we should pursue the requisites of descriptive case studies. For this purpose, relying on the theoretical framework, we will try to find in the renovation plan of Atabak Neighborhood and its implementation processes the elements which are distinguished as structural. Structural elements are those increasing or decreasing chaos.

The research strategy used in this paper is the retroductive strategy. Norman Blaikie has distinguished four research strategies: inductive, deductive, retroductive and abductive. The retroductive strategy starts with the empirical data observation but unlike the inductive strategy, it has "something to look for" (Blaikie 2000, 109). Relying on his/her scientific imagination, the researcher uses analogies and metaphors to uncover and reveal underlying mechanisms; "Analogies involve borrowing ideas from other fields with which the researcher is familiar, and transferring the principles to the area being investigated" (Blaikie 2000, 110). In the current research, the underlying mechanisms have been revealed using the analogy of the chaos theory to explain the structural causes of unsuccessful urban regeneration.

A vast variety of data has been used in this study which can be classified into three categories. The first is the documents that have been used during the planning process, including the official upstream documents and the documents directly related to the renovation of Atabak Neighborhood – such as the Specific Renovation Plan of Imam Ali Area and the Urban Design Plan of Khoob-Bakht Neighborhood. Data of the second category are those which concern the implementation process of the plan, such as reports of executive agents, reports published in mass media and interviews with facilitators and renovation agents. The third category includes all types of data that can describe the condition of the neighborhood before and after the renovation plan. The most important one in this category is the results of the Population and Housing Census taken by the Statistical Centre of Iran in 1996 and 2011. These data have been extracted and categorized by a hypothetical model based on the chaos theory that has been previously developed about the social chaos in the Iranian society (Safari 2012). Then, as the retroductive research strategy suggests, they have been used to fill out and enhance the theoretical framework and explain the structural causes of failure. For this reason, we have extracted and categorized factors in planning and implementation levels which could create chaos as the theory predicts, and then we have investigated the consequences of these factors according to the data.

3. THEORETICAL FRAMEWORK

The new administration of URO had taken lessons from the previous renovation experiences and had decided to launch Atabak Renovation Plan with completely new approaches and methods, but lack of a fundamental theoretical basis as a guideline for these approaches and methods created a kind of incoherence in planning, management and implementation processes. This theoretical basis was also absent in the previous critiques on renovation experiences. In this paper we try to provide such a theoretical basis using the chaos theory as a point of reference.

The chaos theory is one of the most important paradigm shifts in the second half of the 20th century. This theory has been used in several scientific fields. In the social sciences, its major application has been in the field of the sociology of organizations and its usage in urbanism has been mainly in the field of urban morphology (Ben Hamouche 2009). While this theory could be used for explaining the most fundamental characteristics of the Iranian society and cities, in this paper, we have used it in the field of the deteriorated urban fabrics and the requisites that should be taken into account in renovation programs. In spite of a variety of applications in different fields, the chaos theory is concerned with the question of order and disorder in systems, explaining the causes of apparent disorders in behaviors of systems and the way certain mechanisms throw a system into chaos.

Historically, it can be shown that the Iranian society had been considerably exposed to external forces, such as foreign invasions – because of its geographic location - and powerful and authoritarian central governments which were obliged to have high levels of intervention in the society for division of water. One of the results of external forces on the society can be seen in the stratification system that has been always instable (Safari 2012). However, the chaotic influences of exogenous forces are not limited to social structure of the society. They can be seen in the physical aspects, too. Here, we consider the deteriorated urban fabrics as a manifestation of the chaos, produced by exogenous forces. The key idea here is that a chaotic planning cannot remove the chaotic characteristics in urban fabrics.

What the chaos theory can hold here is, first of all, defining the chaotic characteristics of urban fabrics and, secondly, it gives us a useful novel approach to dealing with the problem of deteriorated urban fabrics. Since this theory deals with the principal causes that create disorder in these kinds of projects, it is more than a general description of a good

planning. It can be a useful theoretical instrument for urban planners to avoid failure by distinguishing circumstances that can lead to chaos.

The application of systems theory in social sciences has been mostly within the approach of complex systems. It is necessary to distinguish between complex systems and chaotic systems. While both are considered as non-linear systems, in most of the theoretical literature there has not been a clear distinction between them. But in fact, the complex system theory is less concerned with the initial condition and its focus is on the complex interaction between elements of the system under certain regulations. These elements can be organized when the system is not exposed to exogenous forces (Blaikie 2007, 217). The chaotic system can also be complex, but for some reasons, it has certain disorderly specifications and behavior.

A chaotic system has some special features and characteristics; the most important of them is its type of behavior which is highly sensitive to initial conditions. This means any small change in the current condition of the system can lead to completely different behavior in the future. This characteristic makes the system unpredictable and its behavior seems disordered and irregular (Kiel & Elliott 2004, 6).

What is essential for us in this paper is to know which processes produce chaos in a system. According to chaos theory, the two processes that produce chaos are stretching and folding. The evolution in a chaotic system occurs by these two processes. In the first step, adjacent points move away from each other in the stretching phase and then, in the second step, the system is subjected to a folding process, which draws the previously distant points near each other. The continuous processes of stretching and folding create chaotic behavior in the system (Smith 2007, 29-32).

The stretching process can be considered as the process of 'structural differentiation', the concept which had been defined by Neil Smelser for explaining social change:

"When one social role or organization becomes archaic under changing historical circumstances, it differentiates by a definite and specific sequence of events into two or more roles or organizations which function more effectively in the new historical circumstances" (Smelser 1959, 2).

The new differentiated units should be functionally coordinated with each other. However, if the folding process takes place, this coordination does not emerge. It is possible to show that several historical circumstances in the Iranian society have created these cycles of stretching and folding. This

is to some extent close to the concept of "short-term society" theorized by Katouzian (2004). By and large, this is the case of societies who have been subjected to exogenous forces. Endogenous evolution requires sufficient time so that the differentiated units become coordinated with each other. This is the reason why a system moves into chaos when it is subjected to high levels of exogenous forces.

Chaotic systems are unstructured, non-linear and non-reductive. Basically, chaos can be considered from two aspects: temporal and spatial. The result of sequential cycles of stretching and folding is a specific shape called fractal. The most fundamental characteristic of a fractal is that it is non-reducible. The importance of this characteristic for our study is that all of the modern sciences are founded on a theoretical basis, and that is reductionism. For example, Newton and Leibniz had used reductionism in the fundamental theorem of calculus to establish the differential and integral calculus by generalizing the method of exhaustion, previously used by ancient mathematicians such as Archimedes for calculating the area inside or under shapes. In this branch of mathematics that became the basis for all engineering sciences, curves and shapes are reduced into a set of very short straight lines. The default assumption here is that all shapes can be reduced into very short straight lines. But now, it is known that most of the objects in the universe are fractals and non-reducible.

During the recent century, a set of factors as exogenous forces have pushed the urban mechanisms in Tehran towards chaotic behavior. Authoritarian arrival of modernity, highly centralized political system – government vs. governance – and lack of urban democracy have influenced the entire city, but particularly have led to chaos in deteriorated urban fabrics. These fabrics can be considered as the physical manifestation of chaos. What are now called deteriorated urban fabrics in Tehran are in fact parts of the city which did not have sufficient time for adapting themselves with other parts of the city during the urban growth. The rapid economic growth in the second half of 20th century required vast constructions in empty lands because reconstruction and renovation of the old central urban fabrics was more time-consuming. The vulnerability of deteriorated fabrics physically and functionally deprives it of effective defense mechanisms and disarms it against exogenous forces, which intensifies the chaos. In other words, even if an opportunity comes up for physical or functional improvement in these fabrics in a short period of time, an exogenous force can impose the folding process and, in return, chaos due to the vulnerability of them. Therefore, if the renovation management does not try to eliminate chaos-generating factors, it can intensify the chaotic situation and instead of renovation, it may propagate the deteriorated fabrics.

4. URBAN RENOVATION IN TEHRAN

In the second half of the 20th century in Iran, urban renovation was in the form of vast demolition of old neighborhoods and construction of new roads and buildings according to master plans. All of the renovation plans relied on public funds. Since 1988, after the end of war between Iran and Iraq, large reconstruction programs have led to more comprehensive and urbanistic visions including designing historical and cultural axes. In the 1990s riots took place in several urban slums and the authorities were convinced that they should raise the priority of "problematic fabrics". The necessity of emergency intervention in these areas with low quality of houses and the housing shortage put forward the idea of aggregating small buildings which became the main method of renovation in deteriorated urban fabrics in Iran.

Since 1996 with the foundation of the Urban Development and Revitalization Organization of Iran (UDRO) in the Ministry of Housing and Urban Development and under the influences of global approaches, some new concepts such as empowerment and social participation have made their way into the domestic renovation literature. In the middle of the 2000s, UDRO began identifying deteriorated fabrics in different cities which was a prelude for future programs.

The results of the research of JICA and CEST, published in 2000, persuaded the government and Tehran Municipality to look for more effective solutions. For the first time, some resources for urban renovation were taken into account in the budget law of 2003. In 2014, UDRO prepared the National Strategy Document on Revitalizing, Upgrading, Renovating and Enabling Deteriorated and Underutilized Urban Fabrics. This document draws the main national approach on urban regeneration. The most problematic renovation plan in Tehran has been the renovation of Navab Neighborhood. The program was launched by defining its goals in 1990 which were connecting south of Tehran to its north, reducing congestion of downtown, developing economic prosperity and creating value added as a stimulus for renovation of the surrounding fabrics. But certainly the main goal was construction of a highway to pass through an old neighborhood with high population density. The renovation of residential fabrics was the side project and its role was in fact to provide funding for the construction expenses. A lot of civil services were removed because of the project and were replaced by residential blocks. Expropriation was in some cases with the consent of the inhabitants and, in some cases, with forcing them by cutting off electricity and water and even with police intervention. Residents' participation was limited to

buying bonds, but did not have any role in planning and implementation of the project. The planning was merely based on economic issues and social and environmental aspects were overlooked. Without any social impact assessment study, the first consequence of the project was a huge gap in this homogenous historical neighborhood, which led to vast displacement of the population (Etemad 2013).

5. URBAN RENOVATION IN ATABAK NEIGHBORHOOD

The failure of Navab Experience persuaded the new administration of URO, in power as of December, 2005, to take a new approach. The URO realized that the earlier master plans did not have the ability to cope with the complicated problems of deteriorated urban fabrics. In fact, these plans are based on static, linear and inflexible presumptions which are goal-oriented and always present homogeneous and uniform solutions in all conditions. Deteriorated urban fabrics have special characteristics and require special alternative solutions. For example, a common solution in all earlier plans is widening streets and alleys, but it is not always feasible in these degraded areas with very small buildings. Another factor that played a role in this approach shift was the influence of the global literature on sustainable urban development with its emphasis on public participation and other social aspects.

Atabak Neighborhood is one of the official neighborhoods in District 15 of Tehran. District 15 is located in south-east Tehran and is one of the most degraded districts in this city. About 29 hectares of Atabak Neighborhood has been officially considered as deteriorated fabrics. The neighborhood suffered from social, economic and physical problems with low-income population who could not afford renovation costs. About two thirds of the buildings in this neighborhood were under 75 m2 and with low land price, renovation operations were very difficult. The major part of the neighborhood in land-use was residential. Commercial or industrial activities in the neighborhood were limited to local and low range activities. The only capacities of the neighborhood were its three streets of Khavaran, Mansour and Khoob-Bakht. Khoob-Bakht Street is an axis on the east side of the neighborhood that had been considered as a good starting point for renovation programs (URO 2006).

When the government and municipality realized that the typical master plans cannot solve the specific problems of deteriorated urban fabrics, they began to present new special renovation plans which included two levels: district level and neighborhood level. The neighborhood (second)

level special renovation plan was named the Urban Design Plan. The first district level special renovation plan was prepared for an area in District 15 of Tehran, entitled "Special Renovation Plan of Imam Ali Area". In this plan, Atabak Neighborhood had been divided into six new neighborhoods. One of them was the Khoob-Bakht Neighborhood that was chosen as the first neighborhood in Tehran for which the second level special renovation plan - Urban Design Plan - was prepared.

The Municipality intervention in Khoob-Bakht had begun in 2001. In this year, the municipality of District 15 began expropriation of the buildings at the edge of Khoob-Bakht Street in order to construct a highway. In 2003, following the proposition of the detailed plan of District 15, the direction of the highway changed, so the newly set up Khoob-Bakht Neighborhood was ready for renovation processes.

The URO looked for a pattern of Urban Design Plan to realize its new approach to renovation. Since the dimensions and capacities of the new approach were unknown, the URO decided to pilot it in a limited area in order to identify its weaknesses. For this reason, Khoob-Bakht Neighborhood was selected as the locus of the pilot project.

The URO created a local office in the neighborhood and its first duty was the start-up of construction operations in order to encourage the inhabitants and investors to begin renovation operations. The main

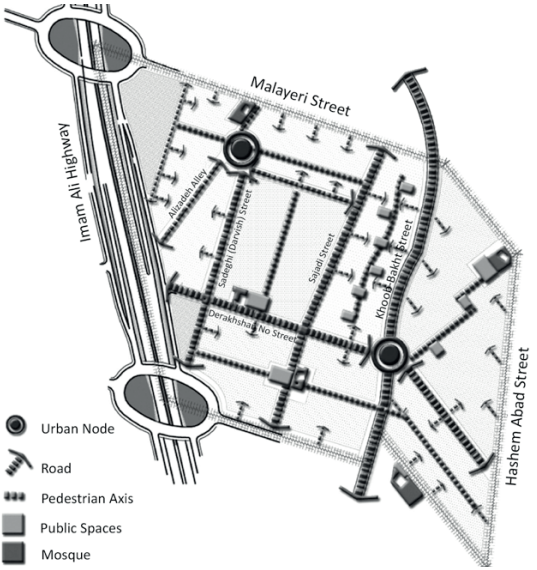

Figure 1: Proposed Spatial Organization of Khoob-Bakht Neighborhood (URO 2006)

goal was aggregating small building by their owners - the land assembly method - under supervision of URO. Furthermore, some buildings had to be expropriated by URO for constructing civil services. Instead of purchasing from the owners, URO used a new method of expropriation, called "a house instead of a house". A backup project was launched by the Municipality to construct new apartments for inhabitants whose houses were expropriated (Andalib 2013, 379).

Even though the plan had been welcomed by the inhabitants during the early stages and the Municipality considered it as its best participatory renovation project, it did not go on in that manner. The public dissatisfaction began, and the participation of inhabitants and private investors decreased due to several problems which will be studied in the next section. Finally, leading to a lot of negative consequences, the renovation plan was put aside in 2009 by the Municipality.

6. FINDINGS AND DISCUSSION

In comparison with previous renovation plans, especially the Navab Experience, the Atabak Renovation Plan has been one step forward. It shows the evolution of Iran's renovation planning as a whole, because there is a transition from the simplicity of the Navab Plan to the complexity of Atabak Plan. This complexification signifies the structural differentiation or stretching process. For instance, it manifests itself in the number of players involved in the plan which was considerably higher in the Atabak Renovation Plan. However, as we will show later, this complexification had not been structurated and that is why the renovation plan did not achieve its objectives. But before that, it is necessary to describe the condition of Atabak Neighborhood before and after the renovation so as to present an overview of the efficiency of the plan.

Table 1 shows some basic demographic and economic data of the Atabak Neighborhood in 1996 and 2011. There has been a considerable decrease in the population of the neighborhood, especially in the population under the age of 15 and then in the working age population. Even though the employment rate has decreased during these 15 years, the activity rate has increased. It means that more people have been obliged to work. The strange decrease in the literacy rate is also notable, given the fact that during these years even most of the rural areas of the country have experienced an increase in the literacy rate. In summary, these data show degradations in the economic and social condition of the neighborhood.

It is obvious that we cannot relate the roots of degradation to the Atabak Renovation Plan, but we can say that the plan has been unsuccessful in stopping, or at least in decelerating the degradation process. This is while slowing down the degradation was certainly possible. For instance, not surprisingly, a consequence of absolutely ignoring the tenants in the plan was the decrease in the neighborhood population. The absence of educational and empowerment packages in the plan can be related to the falling literacy and economic indicators as well.

Indicator	Atabak Neighborhood	
	1996	2011
Population	38617	21539
Population aged 0 to 14 (%)	35.2	20.0
Population aged 15 to 64 (%)	60.1	72.1
Population above 65 (%)	4.2	7.9
Employment (%)	93.1	88.7
Activity Rate (%)	34.7	37.5
Literacy (%)	83.7	81.7

Table 1: Demographic and economic image of Atabak Neighborhood before and after the renovation project (Statistical Center of Iran 1996 & 2011)

Since it is not our objective here to make a list of different disadvantages of the Atabak Renovation Plan, we will not review all of its faults. The focus of our study is on the structural causes of the apparent failure according to chaos theory. For this purpose, we have summarized the chaotic characteristics described in the theoretical analysis in Table 2. While the stretching process is present in any kind of evolution, the folding process merely takes place when there exist exogenous forces which impose some characteristics such as non-reducibility and unpredictability to the system. As a result, the system is deprived of functional coordination and fails to adapt with the environment. Table 3 summarizes these chaos-generating factors in the Atabak Renovation Project at planning and implementation levels.

Level		exogenous forces	Folding processes	Non-reducibility	Unpredictability	Lack of functional coordination	Lack of adaptation
Macro	National planning system	Centralization, lack of democracy & participation	Instability in policies & plans	Local specificity	Unsustainability	Lack of coordination between organizations and laws	Failure of programs
Micro	Renovation plans of deteriorated fabrics	Top-down intervention, lack of trust	Instability in planning, management and implementation	Specificity of deteriorated fabrics	Lack of institutionalization and financial sustainability	Lack of coordination between units of plan	Unsuccessful implementation

Table 2: Chaotic characteristics at macro, medium and macro levels

Level	Exogenous forces	Folding processes	Non-reducibility	Unpredictability	Lack of functional coordination	Lack of adaptation
Planning	Non-participatory planning	Instability in planning	Special renovation plan	Not institutionalizing	Lack of coordination between plan and upstream documents	Ambiguity in goal attainment
Implementation	Distrust among investors and inhabitants	Changing administration	Abundance of dissimilar problems	Absence of social and economic sustainability	Lack of coordination between executive bodies	Unsuccessful or fragmental implementation

Table 3: Chaos-generating factors in Atabak Renovation Project

6.1. Structural factors at planning level

According to the theoretical framework of this study, at first, the exogenous forces at the planning level should be determined. Although following the proposition of district 15 detailed plan, the direction of Imam Ali highway was changed in 2003 in order to create capacity for renovating deteriorated fabrics of the Atabak Neighborhood, in fact, it was, first of all, the "exigence" of the highway construction that had inserted in agenda of the municipality for the Renovation Plan. In other words, the main objective was the construction of the highway and the renovation program was seen as its subsequent outcome. As evidence, we can mention the fact that Tehran Municipality had begun expropriation of the real estates at the edge of the Khoob-Bakht Street in 2001. It is true that this expropriation created a capacity for development stimulus projects a few years later; however, it showed that the renovation had not emerged

from an internal needs assessment, but it was imposed from the outside. It is obvious that a neighborhood cannot be considered as an entity isolated from the whole city, but it is also true that the neighborhood as a subsystem should be in bilateral relation with the surrounding system. In this case, the Atabak Neighborhood with its long historical background should have experienced a surgery and been divided into two eastern and western parts, not for transportation of its inhabitants, but in order to play a role in connecting the north of Tehran to its south; considering that the renovation plan did not have any effective program for promoting the public transport system and had let the neighborhood stay in a "spatial trap".

This problem is rooted in the centralized and top-down planning system in Iran. The inhabitants of the Atabak Neighborhood did not have any contribution in the decision-making process about the construction of the highway. Meetings and dialogues with inhabitants started years after the beginning of the highway construction and of course the purpose of these sessions was not to ask residents' opinions about the highway project. The decision to change the direction of the highway was taken without residents' participation, as well. Not only had the whole plan been imposed from the 'top' without the participation of the inhabitants, but also they did not have any kind of participation in the next phases of the renovation program, especially in preparing the Urban Design Plan of the neighborhood.

Theoretically, the higher the level of exogenous forces, the more likely the plan is to fail. So, one could expect the unsuccessfulness of the plan from the beginning. Nevertheless, considering the exogenous forces in the planning level, the Atabak Renovation Plan had been successful in certain aspects. For instance, "a house instead of a house" program prevented the impacts of an important exogenous force – i.e. housing and land market. It was the most important advantage of the Atabak Renovation Plan because giving houses to inhabitants in exchange for expropriation of their houses, instead of direct payment, has no or less negative effects on the housing market. At the same time, the renovation plan stays immune from the negative impacts of the market system, and the level of unpredictability would be decreased.

At the planning level, the absence of social participation and imposed nature of the plan created several problems later. During the implementation, the problems confused the planners and made them make a lot of changes in the program. It is obvious that planning should be flexible in order to adapt with the conditions in practice. However, when the plan is totally top-down, it experiences unjustifiable fluctuations,

neutralizes its positive effects and creates negative effects, instead. One consequence of these fluctuations was abandoned brownfields and empty lands in the Atabak Neighborhood.

As mentioned in the theoretical framework, folding is the result of exogenous forces and makes the system chaotic and non-reducible. In regard to planning and management in chaotic systems, it is important to know that it is not possible to eliminate chaos without overcoming its sources. Chaos in deteriorated urban fabrics makes them non-reducible. It means that general regulations and earlier solutions that are applicable in other parts of city cannot solve the particular problems of these fabrics. The URO administration had realized this issue, so instead of relying on earlier master and detailed plans, it launched this new special renovation plan and had selected the Khoob-Bakht Neighborhood as pilot for this new approach. It was undoubtedly a correct decision. This correct decision, however, could not guarantee the success of the plan, because so long as the cycles of chaos are not broken, the chaos-generating factors reproduce non-reducibility characteristics. The URO administration had realized the non-reducible nature of the problem but passively followed it without trying to institutionalize the procedures of the plan to break the chaotic cycles.

In the planning phase, an effective mechanism had not been proposed for institutionalizing public participation. The only scheme for communicating with the inhabitants was defining the three levels of relations with them, which included the chief planner, the local office and an agent for each building. Institutionalization means organized acts of people in structural forms that continue over time. Although the local office was in contact with inhabitants, it was a top-down organization and was closed when the renovation program stopped. In fact, the meaning of social participation for the Atabak Renovation Planners was inhabitants' obedience to directives of the plan by land assembly method. There was not a real participation scheme in the plan. The real participation requires institutionalization and empowerment of the residents in order to create their own NGOs[1] and CBOs[2]. Regarding economic sustainability, although the plan had considered the possibility of the private sector participation, it had not defined an institutionalized mechanism for absorbing the resources of private investors. Since relying on public resources was not a sustainable form of financing, the renovation was not sustained.

A major manifestation of chaos in social systems is the lack

1 Non-Governmental Organizations
2 Community-Based Organizations

of coordination between the differentiated structures. This can be an essential structural cause of failure in any development program. In the Atabak Renovation plan this can be seen in the inconsistency between the special renovation plan and the upstream plans - master and detailed plans. The inconsistency between elements of the renovation plan is also another manifestation of chaos. Whereas the Urban Design Plan of the Khoob-Bakht Neighborhood had been prepared as a solution for unsolved special problems of deteriorated fabrics, it was unsuccessful in determining its relationship with the upstream plans. The consequence was the overlap of duties of executive organizations.

6.2. Structural factors at implementation level

As we have seen so far, ignoring the chaos-generating factors at the planning level obscures the future and prospect of the plan. At the implementation level, ignoring these factors shows how a plan based on a new approach was unsuccessful in attaining its goals.

Because of its non-participatory and top-down characteristic, the renovation plan failed to overcome the profound distrust between the inhabitants and the Municipality. Although the residents' contribution to the plan had been limited to land assembly issues, the administration of the plan had counted on resources of private investors. This turned out to be another failure, because the private sector did not trust the Municipality. The residents' distrust in the authorities was intensified when the URO used the police and physical force on several occasions.

We can evidently see the folding process in successive changes in the administration. During the program, the administration of the renovation plan was replaced by a new administration which had a totally different approach to the plan and finally stopped it. On the other hand, District 15 experienced four mayors during this short period. Since folding is the major obstacle to functional coordination, these instabilities reduced inhabitants' and private investors' tendency to participate and provoked conflicts among governmental and municipal executive agents. This is important because any increase in social capital, social participation and institutionalization levels, requires stability that lasts long. Without time and stability, the coordination is impossible.

The non-reducibility of deteriorated urban fabrics, in practice, means that there are several problems for which the same solutions are not effective. In this situation, the administration of the plan encountered a variety of exceptions. In the Atabak Neighborhood there were different

legal problems with inhabitants' property deeds. These "exceptions" can be reduced into a few common cases through institutionalization, provided that there is stability and sufficient time. The Atabak Renovation Plan was unsuccessful in overcoming this problem and in practice, lack of coordination increased the intervention costs and rendered continuation of the plan impossible.

The lack of coordination at the planning level became a big challenge at the implementation level. On the one hand, the governmental organizations did not cooperate with the URO (Roshanali & Andalib 2014, 119). For instance, the government had approved financial support of the renovation plan by means of bonds in March 2001, but it did not become operational. On the other hand, while the URO as an organization is a branch of Tehran Municipality, it had conflicts with other parts of the Municipality during the renovation program. The resistance of the technocrats of the Municipality was rooted in their subordination to the upstream plans and general laws against the specialty of the renovation plan. Furthermore, in practice, there was not a functional coordination among different parts of the plan itself. For example, the Nosazan Project (Renovators project) that had been launched as a backup for renovation to implement the "A house instead of a house" program deviated from its main objective and became a goal in itself.

7. CONCLUSION

In this research, we tried to develop a theoretical basis to help urban planners avoid structural mistakes which cause urban regeneration projects to fail in Iran. While there are a lot of factors to be considered by urban planners in such projects, it is important to understand which of them are structural. The theoretical framework developed here considers those factors which create chaos in the regeneration project as the structural causes of failure. In other words, it suggests distinguishing chaos-generating factors at planning and implementation levels. The Atabak Renovation plan, launched in 2006 and ended in 2009, has been studied as a case study for this theoretical approach.

The Atabak Renovation Project shows an improvement in comparison with previous experiences. While in the previous renovation programs the municipality had been largely the only actor, in Atabak there was the participation of the inhabitants, as well. It was the first experience that was based on the especial renovation plans, instead of the earlier master plans, which made the project problem-oriented and more

efficient. Certain aspects of the plan, such as the expropriation method, "a house instead of a house", and the role of the local offices were also among its advantages.

However, in the final analysis, the Atabak Renovation Plan was not a successful experience because it was unable to cope with the structural causes of failure. According to the theoretical framework explained in this paper, the particular condition of degraded neighborhoods in Tehran is reproduced by chaos-generating factors and any attempt cannot be successful without overcoming them first. In general terms, evolution in social systems requires two kinds of processes: structural differentiation and coordination among the new differentiated structures. While the first process could be found in the transition from previous experiences, such as Navab, to the Atabak Renovation Plan, the second process did not unfold positively. The lack of coordination at different scales – e.g. between different components of the plan or between the executive bodies – was rooted in URO's incapability of institutionalization at different scales. It did not institutionalize the participation of inhabitants and private investors in the renovation process, neither at the planning level nor at the implementation level. While the lack of institutionalization makes the project vulnerable to external forces, successive changes in the administration played the role of the folding process which created and intensified chaos. Because of the instabilities imposed by exogenous forces, the renovation project created a lot of negative consequences and it was put aside by the municipality in 2009.

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Challenging the Lettered City. Densification Strategies and Spatial Justice

Antonio di Campli

ABSTRACT

This paper presents three different strategies for the densification of medium-sized cities in Ecuador. The case study is the city of Loja, a settlement of 200,000 inhabitants in the southern part of the country. The objective is to define precise design actions able to trigger a dense regeneration of medium-sized Ecuadorian cities through a process of spatial and environmental recomposition that favors more integrated relationships between different parts of the city.

Many contemporary medium-sized cities in Ecuador are characterized by particular processes of social and spatial fragmentation related to specific environmental problems at the urban scale. The relatively limited dimension of these medium-sized cities is marked by repetitive low-density urban fabrics indifferent to the environmental system, often redefined as a residual space or barrier between districts inhabited by different social classes. Moreover, phenomena of urban growth in medium-sized Ecuadorian cities are rarely accompanied by the creation of polycentric urban structures. This condition generates an intense movement of commuters travelling back and forth between the downtown area and the suburbs.

Beginning with spatial and environmental surveys and socio-economic inquiries, three elements are considered central to the definition of a densification project: improvements to the habitability of urban space, reductions in social fragmentation and enhanced spatial and environmental equality.

A hypothesis is that the identification of precise strategies that favor urban densification, will help make the urban mosaic of medium-sized Ecuadorian cities more livable, inclusive and spatially and environmentally virtuous. Another hypothesis proposed here is that the configuration of this geography of places will help reduce the social segregation of urban spaces.

Keywords: urban segregation, medium-sized cities, spatial equality, density, urban regeneration

1. INTRODUCTION

This research pursues the goal of identifying strategies of urban densification for medium-sized cities in Ecuador to promote a more integrated recomposition of spaces and environments. At the same time, the study also searches for a more inclusive redefinition of forms of social interaction at the local scale.

Two sets of issues are addressed. The first concerns the meaning and relevance of the concept of densification within contemporary discourses on the design of the contemporary Latin American city. The second set of questions concerns the definition of the characteristics and problems faced by contemporary medium-sized cities in Ecuador.

A case study was developed for the city of Loja, a settlement of approximately 200,000 inhabitants situated in an Andean valley, roughly 2,100 meters above sea level and inside the Amazon River basin. The purpose is twofold. On the one hand it is necessary in similar contexts to determine the present-day conditions under which it is possible and legitimate to prefigure a process of physical and functional densification of urban space. On the other hand, this research defines specific planning and design actions for a dense regeneration of urban spaces in medium-sized Ecuadorian cities.

In recent years a great deal of urban research has focused on large cities in Latin America and the Southern hemisphere in general (Fuchs et al. 1994; Gilbert 1996; Rakodi 1997; Fu-Chen and Marcotullio 2001; Romero 2005; Perlman 2011). These authors have deeply analyzed various forces of urbanization (population movements, labor force changes, social conflicts, etc.), their impact on the processes modifying the city and their ability to achieve forms of sustainable or equitable growth. Environmental and socioeconomic issues are central to much of this research.

Large cities, such as Bogotá or Medellin, have recently improved their management and worked to overcome various social and environmental challenges, with the result that dwelling conditions in these cities are slowly improving. At the same time, especially in Andean countries, there are a number of smaller or medium-sized cities that are poorly managed or planned according to design strategies and spatial models uncritically borrowed from other contexts.

In general terms, the medium-sized city is rarely considered a relevant field of research, at least in Latin America. In Ecuador, over the last two decades a network of medium-sized cities has been gaining in economic and socio-political importance, yet they seem

to lack any specific forms for observing and defining adequate urban design strategies.[1]

The hypothesis advanced here is that in medium-sized Ecuadorian cities the solution to specific urban design problems and a more inclusive redefinition of some forms of dwelling and social interaction at the neighborhood scale can be pursued through precise strategies of urban densification focused on the invention of particular spatial 'devices'. These 'urban apparatuses' are characterized by a superimposition of uses and functions able to define dense forms of use and social interaction in currently residual environments and networks. The term 'device' is intended in the Foucauldian sense of machinery, a *dispositif*[2] (Foucault 1971, 1975) that enhances different forms of power within the city by attempting, in this case, to address the issue of how notions of spatial equality/inequality relate to issues of densification. The configuration of these devices may heighten the spatial diversity and social inclusion of the urban mosaic of medium-sized cities in Ecuador by configuring a geography of 'membrane-spaces'[3] between neighborhoods inhabited by different social classes.

To support this hypothesis, the text is articulated in three parts: the first presents a reflection on some of the characteristics and problems of Latin American cities (chapter 2); the second part offers a more precise look at the issues faced by contemporary medium-sized Ecuadorian cities (chapter 3); the third and final part identifies a selection of urban design strategies (chapter 4).

The literature analyzed for this essay includes texts and essays that can be assigned to two main fields. The first field is relative to texts and design experiences linked to issues of urban densification, urbanity and congestion. The second field embraces a vast body of literature on Latin

1 The following notes are taken from a study of strategies of urban densification for medium-sized Ecuadorian cities developed at the UTPL, Universidad Tecnica Particular de Loja, as part of the Prometeo Program Fellows Research, Senescyt, Quito. This research began in October 2014 and ended in August 2016.

2 The French term dispositif can be translated variously, as 'device', 'machinery', 'apparatus', 'construction' or 'deployment'. According to Michel Foucault this concept corresponds to a set of discourses, institutions, architectural forms and spatial techniques in which some elements are able to control and direct the conduct of subjects.

3 The reference is to the concept of creolisation and membraneous politics developed by the French philosopher Yves Citton.

American and Ecuadorian urban history and phenomena. This literary inquiry is completed by socio-economic and spatial analyses (population movements; population density; average income; environmental analysis) of the Ecuadorian city of Loja and by a series of interviews with Ecuadorian urban planners and scholars, including professors and architects such as David Barragan, Santiago del Hierro, Diego Carrion, Handel Guaysamin, Hernan Orbea Trávez and Leonardo Izquierdo Montoya. In particular, the last two have provided relevant information about socio-spatial fragmentation processes characterizing Andean medium-sized cities.

The majority of interviews were face-to-face, semi-structured and open-ended.[4] They were supported by an aide-mémoire referring to topics such as: density, centrality, the role of state government in planning policies, informality, colonialism, social conflicts and dwelling practices. Hernan Orbea Trávez, in particular, offered interesting and seminal reflections on the sense and meaning of urban centrality in Andean cities and on grassroots strategies of resistance to formal planning practices adopted by local inhabitants. Investigations of Loja, conducted through urban and social analyses and interviews with local stakeholders and inhabitants, highlighted some issues relative to the characteristics, problems and practices of dwelling in this city.

2. CONTEXT

The Latin American city is generally described by architects, planners and scholars of the social sciences as an 'extreme' space, marked by persistent and articulated processes of spatial and social fragmentation, generally associated with images of boundless and uncontrollable urban growth (Gilbert 1994; Davis 2007; Kinsbruner 2010; Franko 2007).

The social, historical, political and economic reasons underlying such processes have been widely investigated, especially by the social sciences. Latin American and European traditions and practices of research have identified a number of elements that can roughly be allocated to two large categories.

The first consists of spatial and territorial figures and issues. The logics behind the construction of urban spaces in Latin America

4 The interviews were held in the private studios of these architects or in the university departments where they work.

are largely the output of a formal matrix described by the figure of the grid or *damero* (Joseph and Szuchman 1995; Rodgers et al. 2012). It is an abstract, purely geometric space, wholly unrelated to physical and social contexts and conceived as a repeatable prototype. The desire for isotropy and the search for egalitarian conditions of settlement through the abstraction of the damero have, however, been contradicted since the earliest colonizations by a particular dual condition whereby the utopian social order of newly founded cities was forced almost immediately to confront its double, the indigenous city. This is an urban space in some cases planned according to specific social conditions, for example the Jesuit reductions in Paraguay, and in others built according to regular patterns and symbolic connotations (Carrión et al. 1983).

These two places soon established a strongly asymmetrical relationship, reflecting social relations between settlers and natives (Isbell 1977). The particularly pedagogical and doctrinal nature of the new indigenous town was emphasized by the central role afforded to the space of religious worship.

These experiences defined a typically Latin American idea of urban centrality, the separation of functions and density. The principles of separation and dependence, the dual character of colonial urban space articulated according to the center-periphery structure, have also been reproduced at the larger scale. In Latin America, the city is basically the only place in which to look for the 'good life' (Gutiérrez 1993; Cummins and Rappaport 2012). This phenomenon drives constant migrations of rural populations toward urban areas in an on-going search for social redemption.

The second category, marked by political themes, is tied to a weak democracy in decision-making and management processes, and to the persistence of colonial forms in the construction of urban space.

In urban contexts inhabited by lower-middle or poor classes, redevelopment and public initiatives of urban regeneration aimed at legalizing spontaneously constructed districts are hampered by particular forms of resistance to power and authority; a resistance demonstrated by the very social groups that should theoretically benefit from these transformations. This strategy is expressed through a refusal to adhere to the more regulated forms of dwelling that public action seeks to promote (Orbea Trávez 2015; di Campli 2011). The lack of trust, expressed above all by the poorest inhabitants of the city, in the purpose and often paternalistic attitudes characterizing the informal regeneration of urban neighborhoods, produces unexpected effects of deregulation and triggers a variety of unanticipated speculative processes.

Examples of such drifts can be observed in some of the processes characterizing social housing neighborhoods built to solve the housing crisis of informal settlements in medium-sized and large Ecuadorian or Colombian cities. In many cases, residents in these areas prefer to rent the new apartments assigned to them and build other houses for themselves in distant, new, informal settlements. These new unauthorized residential areas, constructed after the redevelopment and inclusion of consolidated informal settlements within the perimeter of the formal city, in turn require new infrastructures and new services that are often realized through political and electoral exchanges (Orbea Travez 2015; Carrión 1973, 1983, 1985).

In a context marked by similar processes and logics, the social fabric tends to 'decant' in urban space, settling in layers or homogeneous social groups. While in the past this distinction was linked primarily to ethnic issues (neighborhoods for white people, mestizos, natives, blacks), what is important today is economic status, although particular social groups, for example native peoples, continue to insist on settling in exclusive communities or mingling only with low class mestizos.

The result is an urban mosaic in which each tessera[5] corresponds to specific social groups, urban landscapes and ways of using space; a mosaic that very often tends to expand as one moves away from the city center.

These processes of fragmentation, separation and definition of asymmetrical relationships between different parts of the city identify urban areas where each part has a specific role and character, specific functions and inhabitants belonging to a distinct social group. Despite its chaotic image, the Latin American city appears to be regulated by rather precise orders and principles (Keiner et al. 2011; Van Cott 2008).

3. MEDIUM-SIZED CITIES IN ECUADOR

In almost all cases, urban studies and scholars of the social sciences have traditionally observed these phenomena in the metropolitan city (Perlman 2011; Bredenoord et al. 2014). Rio de Janeiro, Buenos Aires, Bogota, Caracas and Lima have been the object of investigation and experiments with complex planning, urban and social design strategies whose successes and failures have been widely debated.

5 The term tessera, in mosaic work, refers to a small piece of glass, stone, or other material cut in regular shapes.

An interest in major urban centers, the issues they raise and the solutions identified for them has, indirectly, suggested that in Latin America the urban question is essentially defined by themes and problems of the metropolis and that the design solutions tested in these areas are substantially exportable to other urban contexts (Burdett 2014; Lerner 2014; McGuirk 2015).

However, in recent years phenomena such as the political stability of the South American continent, a general improvement in economic conditions and the emergence and consolidation of the middle class are triggering unprecedented changes in the forms and collective vision of dwelling.

From the beginning of the 2000s, a desire for a different urbanity, or 'cityness,' has emerged across South America: it can be found in the discourses of various subjects and social groups, from architects to urban planners to politicians. There is an anxious search for new urban spaces characterized by less rarefied, less divided, more compact and cozier dwelling conditions. The preference for less introverted forms of settlement, the affirmation of discourses on urban sustainability, ecology, the importance of public space, the recovery of historic incrementalist social housing strategies, or the success of urban acupuncture experimentations, all seem to speak of a search for 'denser' urban space.

This desire for social, spatial and functional density is one of the main symptoms of the unstable and liquid condition of the contemporary Latin American city (Salazar 2001; Rincón Avellaneda, 2004; Aguiló et al. 2009; Villasante 1997; Pérez Bustamante and Salinas Varela 2011; Vera and Padilla, 2011). At the same time, many Latin American contexts demonstrate a less hierarchical organization of settlement at a territorial scale. This phenomenon is characterized by the emergence of networks of medium-sized centers that are triggering a regionalization of both economies and territories.

All of the phenomena described above are closely connected. Together they outline a new urban question that, unlike the classic themes tied to the Latin American city, requires precise and adequate design strategies (Secchi 2013).

Ecuador is one of the territories where these phenomena are most visible. This country is characterized by a structure of settlement arranged according to a 'cantonal' logic, supported by an articulated network of medium-sized cities. According to the characters and dimensions of urban systems in Ecuador, economically and politically dominated until the 1990s by Quito-Guayaquil, respectively home to 3 and 3.7 million inhabitants, the term medium-sized cities can be applied to settlements of

between 200,000 and 400,000 inhabitants (Orbea Trávez 2015). Examples of such cities in the Andean highlands include Riobamba (150,000), Ibarra (140,000), Ambato (350,000), Loja (200,000), Machala (207,000) and, to a certain degree, Cuenca (400,000). In the entire country there are approximately ten medium-sized cities.

Since the early 2000s, in the wake of migratory inflows from rural areas and the return of families who had emigrated abroad, this framework of settlement has acquired a growing strength. In many ways it has unexpectedly balanced the force and attractive power of Quito-Guayaquil.

The processes of growth and urban transformation that have characterized medium-sized cities in Ecuador in recent years tend to present themselves as more manageable than those in larger centers. Medium-sized cities appear to be less marked by the uncontrolled expansion of residential suburbs, urban violence and social insecurity traditionally associated with metropolitan urban landscapes. In many cases, these dynamics are not without deregulations and serious problems; however, medium-sized cities, under certain aspects, have been able to define less conflictual, even if not fully integrated, conditions for cohabitation between different groups and social classes. In particular, the phenomenon of informal development in these cities appears less dramatic and ambiguously grafted onto the logics of constructing the formal city, making processes of distortion often indistinguishable from those of clumsy urban planning (Carrión 2001; Centro ecuatoriano de investigación geografica 1983). In particular, processes of urban growth in contemporary medium-sized Ecuadorian cities are largely the outcome of specific phenomena of economic speculation promoted by middle class families and by those migrating to countries like Spain and Italy since the early 2000s. Having improved their economic conditions abroad, many have decided to return to Ecuador and invest their savings in the construction of residential buildings either for their own families or for the rental housing market (Cemla 2010).

In the city of Loja, during the late 1990s and early 2000s, approximately 50% of all new gated communities were financed through remittances. In recent years remittance money is largely invested in the construction of detached row houses inhabited by their owners. In the western peripheries of Loja, approximately half of all detached houses and detached row houses built over the past 15 years have been financed through remittance investments (Izquierdo Montoya 2014).

Unlike previous phenomena of urbanization in Ecuador, from the 2000s onward, the investments of the middle class are no longer

directed solely toward the two major centers of Quito and Guayaquil, but now include the network of medium-sized urban centers (Orbea Trávez 2015). The idea of a home and the economic strength of these actors make the themes of planning and controlling urban growth, the cohabitation between different classes and social groups, solutions to problems of informal development, different from those characterizing large cities, which boast a lengthy tradition of research and urban design experiences.

3.1. Problems Detected

All of this does not mean that medium-sized Ecuadorian cities do not have their own specific processes and problems.

The first element worth noting here is the presence of well-defined desires and the imagination of what a home is. These visions and practices appear to be more consolidated, and therefore less malleable, than those characterizing, for example, some of the dwelling situations identifiable in the suburbs of many large cities. In medium-sized Ecuadorian cities, the ideal, real or imagined freedom of choice between alternative forms of living that are seemingly possible to invent in isotropic urban space, is almost always denied by the recurring preference afforded to the type of block row houses defined by more or less regular grids and road alignments.

Forms of construction of new residential areas are marked by incremental logics of spatial development and construction, and by the adoption of particularly 'showy' architectural languages. A house is more image than space. It is a device for affirming the status and economic condition of the family who lives in it. This prevalence of the visual over the spatial describes the competitive mindset of the urban landscape in many of Ecuador's medium-sized cities. The satisfaction and enjoyment that people show with respect to these forms of design and construction of residential spaces are exemplary of such consolidated dwelling practices and ideas (Klaufus 2009, Ouweneel 2012).

A second element is constituted by the fact that the geometric damero informing the urban space of medium-sized Ecuadorian cities – informal, consolidated and central – is almost always indifferent to the environmental system. A system that, in this way, is redefined as a residual space. It is an environmental network plagued by phenomena of hydraulic or geological risk, ecological instability and degradation. In the overlap and interaction between the abstract grid and the physical urban 'palimpsest', a friction is produced.

In the processes of this resulting 'abrasion', the various articulations of the environmental system, from hydrographic networks to geological deformations and from agricultural to forested areas, are redefined as a threshold between parts of the city inhabited by different social groups and classes.

The relatively small scale of medium-sized cities, moreover, is not accompanied by the definition of polycentric urban structures. On the contrary, here phenomena of growth almost always strengthen the tertiary, commercial and administrative roles of consolidated central parts of the city, already characterized by such features. This phenomenon, associated with an exasperated functional connotation of the urban fabric, sheds light on a third question: the important movements of commuters between downtown areas and the suburbs.

All of this is evident in Loja. Unlike other medium-sized cities such as Riobamba or Cuenca, Loja does not appear to possess any particular spatial or urban landscape qualities, and can therefore be considered a prototypical medium-sized Ecuadorian city. Over the past 20 years, Loja has transformed itself from a local scale services provider town to a center of attraction for the immigration of rural populations from the southern provinces of Ecuador.

Processes of urban growth in Loja have been partly regulated and indulged. That said, they have produced effects such as an excessive pressure on the colonial central district, the privileged place for trade and service activities. At the same time, a poor connotation of new suburbs that can be described as purely residential neighborhoods can also be detected.

3.2. Neighborhood as a Product

Urban space in Loja can be synthetically described as a composition of specialized places.

It is a functionally and socially divided space, marked by clearly defined spatial and temporal rhythms and forms of dwelling. In general, especially in its suburban parts, this urban space appears to be largely unappropriated by its inhabitants. There are only a few specific dwelling practices, such as spots of formal and informal commerce or sport activities. It is therefore a place where forms of dwelling tend to acquire some extreme characteristics.

Here it is possible to recognize a density of dwelling, which manifests itself in well-defined rhythms in some of its central parts,

colonized by a variety of forms and commercial practices. Public space seems to be substantially considered as little more than an infrastructure at the service of mobility, and social interaction is evident only in some public or private areas, such as small parks or other welfare amenities.

Here we find separation, alignment, distinction and the preeminence of image over material and spatial qualities. In the sprawling residential parts of the city, urban space, even when it doesn't present particular conditions of social insecurity, offers substantially limited opportunities for social exchange beyond the front door of the house.

The condition of alienation experienced by residents of Loja in the built suburban environment generates a 'disillusion' that leaves space almost totally blank. Here the consumption of urban landscapes or architecture as pure image dominates. The urban fabric of Loja is appreciated and evaluated primarily by sight, like an object in a gallery, on a screen or in an advertisement, rather than the setting in which upper and lower middle-class people actually live.

Overall, the urban environment in Loja is characterized by strange spaces: homogeneous, rationalized and constrictive, in other words, where people feel forced to adopt precisely regulated behavior. At the same time, these spaces are widely spread across the Zamora valley according to some repetitive and trite patterns.

The alienating conditions of this urban space are marked by a paradoxical situation characterized by the dissolution of formal boundaries between 'happiness' and 'misery'. It is a harsh separation, represented by regular blocks of row houses and a diversity of separate 'dwelling environments' coupled with sites in turn wholly disconnected from one another.

Finding a purpose for urban design here is exceedingly difficult. Architecture is something extra, an urban decoration or icon. In this context, the expansion of the city continues to be conceived and realized according to implicit colonial logics, as an automatic and uncritical repetition of abstract geometrical grids or importation of landscapes.

This approach transforms buildings and neighborhoods into commodities and products. The urban environment is marked by a widespread disregard for everyday life.

Carefully observing Loja, from its outskirts to its newer parts, it is possible to affirm that everything resembles everything else. Urban fabrics, residential typologies and spatial patterns are all repetitive and reproduced like rubber stamps on paper. This 'sameness' epitomizes both abstraction and control and fosters a pervasive impossibility to distinguish between architecture and the city.

Repetition is not a consequence of incompetence, or even a lack of imagination. Instead, it is the inevitable product of a range of mindlessly repeated spatial practices. Loja's repetitive urban spaces are the outcome of repetitive gestures (by architects, planners, dwellers and property developers) associated with two instruments, both duplicable and designed to duplicate: the damero and the row house.

On the surface, this dominance of repetition could be construed simply as the product of atrophied imaginations. Such a view, while holding the myth of expertise in reserve, sets aside the possibility that space is a product, subject to economies of scale in production, reproducible and attaining its greatest value when it is an exchangeable commodity that overwhelms the value of space as something useful.

The quantifiable outshines the qualitative: are these spaces interchangeable because they are homologous? Or are they homogeneous so that they can be exchanged, bought and sold?

Whether or not we believe that repetition is one result of a certain similarity between these spaces, or a requirement of their status as objects, what is certain is that in Loja repetition reigns supreme. An urban space of this kind is a product *sensu strictu*. It is something reproducible, the consequence of repetitive actions: reproducibility, abstraction and quantifiability. The visual dominates the realm of products to the same degree that the importance of packaging design influences appeal and salability. What characterizes many of Loja's suburban and urban settings is their pronounced visual appearance. They are made with the visible in mind: the visibility of status, people and objects, of spaces and of whatever they contain.

The predominance of visualization conceals repetitiveness. In this condition, characterized by persistent colonial spatial logics, by the absence of an articulated and diversified urban space, the home becomes a complex universe of overlapping references, daily rituals, practical needs, tacit desires and ambitions that speak to one another in architectural space.

3.3. Overcoming Cartesian (and Cortezian) Logics[6]

The colonial idea of smooth and geometrical urban space recalls the concept of empty space conceived by Descartes and the absolutist

6 The reference is to the regular pattern used by Hernan Cortez in the re-founding of Mexico City superimposed atop the fabric of the old Aztec city of Tenochtitlan.

tendencies of Cartesian logics. The limitation of these views of space is that they mainly encourage an abstract mathematical idea, which makes considerations of 'social exchange' seem out of place. They foster an idea of architecture and of urban settings as autonomous objects in space, positioned mainly for aesthetic appreciation.

Intended in this way, space is decoupled from time, and thus considerations of the social life that unfolds in urban space almost disappear. Briefly stated, 'counter-projects' are useful here to redefine urban space on the basis of its specificities. They serve to bridge the gap between the mental and social realm, between the implicit colonial habits that continue to shape contemporary dwelling practices and the space of inhabitants who deal with material things.

To bring this about, the centrality of social life and social practices must once again become the focus of discussions of urban space. The endless extension and rigid separation of abstract geometrical spaces, which exhibit a dominant leaning toward fragmentation, resembles a trend subordinated to automatic thinking by planners, inhabitants and real estate developers. Moreover, separation and fragmentation are the primary conditions and means by which this spatial logic preserves itself, producing an endless colonization of new areas in the name of self-replication.

This kind of urban space seems to be shaped to eradicate spatial differences and to convey intolerance (Park 1967; Balbo 1993; Davis 2007). Working under persistent opaque colonial logics produces and reproduces urban spaces that embody a close association between daily routine and urban reality, within routes and networks linking the places set aside for work and private life and areas dedicated to leisure activities. By reproducing the features of Latin-American colonial space, architects, planners and inhabitants are destined to continually determine the most extreme separation between place and inhabitant. Spaces for social life are almost impossible to achieve under these circumstances.

In this context, whenever urban reconfigurations, transformations or densifications are discussed in terms of functions, physical densities, quantities or indicators, the discussion has again left the realm of the social and entered into the abstract. Understanding urbanism according to the criteria of objects thus risks insisting on considering architecture and urbanism as items of exchange deprived of their social content. It is important to retake the social realm.

4. COUNTER-PROJECTS, COUNTER-PLANS, COUNTER-PROPOSALS

The link between the fragmentation of medium-sized Ecuadorian cities and the persistence of colonial logics characterized by specialization, rarefaction and functional and social separation, is not coincidental. Their association is inevitable. Thus, a truly alternative space would necessarily entail recapturing connections and redefining new 'densities' between dissociated elements and spaces.

Loja is home to an enduring and actual presence of 'counter-spaces' (Soja 2010) and the persistence of certain modes of social life connected to them. In neighborhoods such as Ciudad Victoria and Ciudad Alegria, parts of the urban environmental system, corresponding to hydrographic networks, are simultaneously residual and dangerous areas. In some cases, unexpectedly, they host interactions or social exchanges between people from neighborhoods inhabited by different social classes. In *barrios* such as Tierras Coloradas or Obrapia, the grid is interrupted by spots of collective space that function according to a precise temporal rhythm, locally known as *Canchas/Kanchas*. They are dusty rectangular spaces dedicated to sport that work, especially during weekends, as 'social condensers', whose margins attract social groups of different ages, trade and food sales. They resemble the kind of public space that once characterized ancient pre-Columbian settlements and which, in some ways, is still alive in contemporary Andean cities. In these unstable and poorly defined spaces there lies a possibility to construct new spatial codes where what is lived, planned and perceived can finally be interrelated.

The main purpose, then, of the re-qualification of medium-sized Ecuadorian cities, is to define counter-projects, counter-proposals and counter-spaces. This task is a shift from a 'problem of space', or the assertion of an all-encompassing network of explanations which are a direct expression of abstraction and reductionism in densification strategies, to 'spatial practices'.

This approach questions the primacy of the visual realm in urban regeneration practices, in other words, densification as a quest for metropolitan images, and the graphic dimension which belongs, as one of its chief properties, to an abstract space that leads toward a generalized state of deprivation. Yet it is important to acknowledge that articulating counterproposals and realizing them is no easy task. Counter-plans or counter-projects face no shortage of obstacles. The most serious is the fact that on one side there exists a range of resources and strategies on a vast scale.

On the other hand, in peripheral contexts such as Loja, there is limited knowledge and limited interest in opposing these forces. In any case, the necessary innovations can come about only via the interaction between projects and counter-projects, between planning and counter-planning. It is only through these collisions that proposals for surpassing reality can be invented. It is an optimistic attitude.

Two hypotheses can be investigated and tested to address some of the specific urban design problems characterizing medium-sized cities in Ecuador. The first one is that current massive residential growth, and its consequent consumption of land and commuter movements, cannot be solved by traditional policies of urban densification, such as the construction of new residential-commercial buildings on vacant suburban or downtown lots. These problems can only be solved in the long run, through innovative economic and social policies that question the persisting colonial understanding of rural territories as exclusively productive areas, and through policies able to strengthen the role of small urban centers. What is missing is a public discussion of economies and ideas for the settlement of rural areas. As long as rural inhabitants see the city as the only place where they can find the 'good life', it will be impossible to stem the influx of migrants directed toward medium and large cities.

The second hypothesis is that a spatial and social re-composition of these cities, coupled with the most inclusive redefinition of forms of dwelling and social interaction at the local scale, can be pursued through precise strategies of urban densification. Some clarification is required here. Traditional meanings associated with the concept of urban density are related to current topics such as economic sustainability, reducing the consumption of land and containing urban sprawl. These policies and design techniques are the outcomes of a series of very important and highly relevant research and experiences. All the same, in the contexts explored here, these strategies appear capable of resolving only a few problems, related mainly to the compactness of urban space, the *mixité* or co-presence of multiple functions and the improvement of urban landscapes. These forms of densification trigger virtuous uses of abandoned or underutilized urban spaces, reducing problems of small-scale mobility and relieving the demand for social housing. (Amin and Thrift 2002; Amphoux et al. 2003; Bruegmann, 2005; Koek, Maas & van Rijs, 2013; MVRDV 2006; Schramm 2008; Bates & Sergison 2014; Tröger 2014). Nonetheless, in many ways, these strategies do not seem to directly address some of the relevant issues, social conditions or dwelling practices characterizing contemporary medium-sized cities

in Ecuador. Alternative ideas about urban densification strategies, then, can be defined by focusing on experimentation and the invention of particular spatial devices that favor social interaction. Similar devices are characterized by a superimposition of uses and functions with the ability to define dense forms of use in currently residual spaces.

The devices are located within residual environmental systems, locally known as *quebradas.* These minor hydrographic networks presently act as barriers, contact zones or interfaces between neighborhoods inhabited by different social classes. These in-between linear 'counter-spaces' may be considered potential sites for subverting current conditions precisely because the positive rendering of the gaps they describe, simultaneously links and separates contrasting conditions in precisely the ways that overly rationalized urban patterns attempt to erase. Here, the presence of residual vegetable gardens fosters some commercial activities; the steep slopes of the *quebradas* are used both as garbage dumps and playgrounds where middle class and lower class youngsters meet.

The strategy of inserting devices conceived as 'urban interiors', in lieu of more traditional public spaces, is coherent with the particular characters of these kinds of cities. In these urban settlements, forms of social exchange tend to appear in opaque, protected spaces, rather than in public spaces with a predominantly symbolic value. It is important to highlight that the realization of these devices is part of a strategy focused on the environmental regeneration of minor hydrographic networks. They might be conceived as volumes suspended above the *quebradas,* or realized in safe flat areas close to rivers. These devices correspond to systems of spaces conceived in section as a sequence of layers hosting a wide range of functions and possible uses: sport facilities, gardens, commercial spaces, nurseries, small craft workshops, recreational areas or schools. Such sequences of layers may correspond with urban interiors, open spaces or transitions between inside and outside. In physical terms, these devices are designed as a sequence of narrow ribbons spread among the various articulations of the environmental system. In environmental terms, these 'membranes' are themselves hydraulic machines that can be used to collect and purify rainwater and waste-water, linking and improving the ecology of the *quebradas*.

This strategy of densification does not correspond with to an attempt to make the existing urban fabric more porous or functionally variegated, nor is it based on the insertion within existing urban fabrics of traditional models of public space, such as squares, boulevards or arcades. Rather it accepts the functionalist and in some ways 'hypermodern'

character of this urban space, inserting 'densification devices' within the zones of contact between what are currently socially and spatially separated neighborhoods. In this sense, they can be considered counter-proposals.

A central role in the identification and configuration of these devices is therefore entrusted to the upgrading of the environmental network, redefined in some of its parts as a 'membrane', a point of contact and social interaction zone between parts of the city and social groups currently separated from one another, and to inventing new ecological qualities and features. This particular strategy of densification, intended as the consolidation and intensification of the borders of existing neighborhoods, identifies a number of new public open spaces, public facilities, spaces for leisure, commerce and labor, envisioned as social and environmental interaction devices. These devices may be semi-public, communal or entirely public. A membrane is a selective barrier, not a smooth open surface. It allows some things to pass through and stops others. In this sense, it may acquire the structure and character of an urban interior crossable by subjects, functions and processes.

The result would be the definition of a number of innovative 'social condensers', central places able to host a variety of social exchanges related to leisure, commerce, work or sport. These devices would presumably help reduce current commuter flows between the center and the suburbs and reinterpret the friction between the abstract grid informing existing urban fabrics and the residual environmental system.

The definition of these spatial devices is expected to introduce a more inclusive redefinition of relations between districts inhabited by different social classes, increasing urban comfort. These devices could also assist with an incremental physical densification of surrounding neighborhoods. Once their inhabitants have found adequate centralities, urban comfort, places of work and for leisure activities, they are probably more eager to begin to trigger processes of incremental modifications to the residential fabric.

Densification is intended here as a series of counter-projects that define protocols for consolidating and intensifying uses and social exchanges, more than increasing volumes or inhabitants per hectare. These counter-projects presuppose a collective ownership and self-management of space founded on the permanent participation of interested stakeholders with their multiple, varied and even contradictory interests, skills and visions. Thus it also presupposes confrontation. Counter-projects help overcome separations and dissociations between

social groups, spaces and, finally, times.

It is not a question of quantities of dense urban fabrics, but instead one of producing space capable of redefining more inclusive and more virtuous local dwelling practices. These counter-projects represent a sort of utopian challenge, a utopia of real projects whose emergence relies more on an *orientation* than a *system*.

These programs and projects have to be planned by the resident population through participatory processes. Only in this way is it possible to precisely define the characteristics and dimensions of each intervention. Nonetheless, each project must be implemented by the municipality responsible for defining new planning instruments in order to mediate between bottom-up interests and top-down visions traditionally expressed in plans such as the *Plan de desarrollo y ordenamiento territorial* (Urban Regulatory Plan) and the *Plan parcial* (public-private initiative plans for the design of specific urban interventions).

5. CONCLUSIONS

In the Latin American tradition of incrementalism, characterized by progressive housing strategies and participatory design in architecture and urban development, it is possible to observe how the evolution of well-equipped neighborhoods is physically dense and socially rooted. In the persistent colonial dwelling tradition characterizing these territories, once inhabitants have improved their economic or social conditions they tend move toward wealthier districts. The strategy of densification proposed here is an attempt to question and criticize this attitude of rootlessness and it addresses some very specific problems. The goal is to resolve current questions of dwelling marked by an interrelation between social and environmental issues.

The proposed strategies and devices can be conceived as a design 'protocol'[7] to be replicated in various medium-sized cities across Ecuador. The urban densification protocol does not claim to be scientifically precise, like those proposed in the field of natural sciences. It needs to be redefined case-by-case in response to different urban contexts.

7 Protocols are employed in a wide range of experimental fields, from the social sciences to physics. They are commonly described as a procedural method for design and experiments. They aim at standardizing research or design methods in order to ensure the successful replication of results by other researchers or designers.

The use of the term protocol would appear to generate a paradox, given the repeated criticism of the inherent tendency to traditionally conceive the Ecuadorian city according to fixed models that are often indifferent to context. The attempt here is not to totally refuse such a habit, but instead to 'alienate' the traditional automated protocols that have informed the construction and evolution of the colonial city from its inception, in order to alter its abstract and mathematical character. It is an attempt to use the tradition in order to change the tradition.

The core of the discourse expressed in the design strategies presented here is the necessity to innovate. The intention is to reverse the twentieth century trend by which Ecuadorian planning and design techniques, and notions, are largely borrowed in an uncritical manner from European or North American approaches (Orbea Trávez, 2015). The concept of innovative 'social condensers' conceived in this text provides a range of spatial solutions able to open up our imagination toward what might be possible if the design of isolated urban interiors, devices and hybrids were reframed in a more coherent and precise discourse. What is at stake, then, is the reinforcement of a methodology of urban fragments intended not as anomalies in a static body, but rather as a model for generalizing a radical or insurgent theory of urban design.

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SECTION THREE
POETRY AND URBAN REGENERATION DISCOURSE

Toward a New Earth: Reconceptualizing Urban Design with Vicente Huidobro

Maxwell Woods

ABSTRACT

Environmental urban design is often conceptualized in terms of a harmonious organic order in which all parts, natural and artificial, are integral elements of a living, interconnected system. In addition to being connected to anti-democratic politics, this mode of urban design has been delegitimized by the emergence of the Anthropocene, our current human-dominated geological epoch in which the natural domain has been subsumed within the human. In other (urbanist) words, urbanization becomes planetary in its scale, razing the properties formerly distinguishing city and nature. Environmental urban design in the era of the Anthropocene and planetary urbanization is called upon to develop a sustainable non-organicity that confronts the 'second nature' created by humans composed of brownfields, railways, mines, power stations, financial centers, and pipelines. In the United States, Landscape Urbanism has recently developed design practices to do just this and regenerate cities, but little has been done to reconceptualize the program of environmental urban design. A reading of the poetics of Vicente Huidobro in light of the Anthropocene and planetary urbanization fulfills just this task. In his poem, *Ecuatorial* (1918), Huidobro imagines a new global spatial order defined by natural landscapes being transformed into and juxtaposed next to built environments and tied together by new technologies of communication and transportation. In short, the poem demonstrates an urbanized, global, non-organic spatial order so often (rightly) attacked by environmental urban design. Yet it is my contention that in this poem Huidobro conceptualizes planetary urbanization and anthropogenic transformation of the landscape as the creation of a non-organic, second earth. Huidobro's poetics provide a framework within which we can begin to discuss global, urban regeneration in the Anthropocene. Confronted with the need to imagine a new urbanized earth created under the threat of planetary destruction, Huidobro posits a poetic solution.

Keywords: Huidobro, anthropocene, geoengineering, landscape urbanism, landscape architecture

1. INTRODUCTION

The Chilean avant-garde poet, Vicente Huidobro, was born to an aristocratic family in Santiago in 1893. After moving to Paris in 1917, he quickly became part of the world of European modernism and founded the avant-garde movement, *creacionismo* (or Creationism), characterized by its conceptualization of writing poetry as the creation of a new, living thing, thereby making the poet equatable to a god. As Huidobro states in his arguably most famous phrase, and one often used to summarize the poetics of *creacionismo*, "the poet is a small god" (Huidobro 1963, 255). As a modernist and avant-gardiste, Huidobro is often tied to an anti-environmentalist framework credited with destroying the pre-modern kinship between humans and the natural world.[1] In Lawrence Buell's words, this kinship "withered in the last half of the 19th century; high modernism announced its death; [but] modern ecologism has brought it back" (1995, 180). Such a broad critique of modernism and the avant-garde does not hold up to historical evidence. For example, the Russian avant-garde painter, Kazimir Malevich, grew up in the country, attended agricultural school prior to becoming an artist, and identified nature as a key influence on his work. What *can* often be said, however, is that avant-gardes, including creacionismo, announced the death of the *organic* kinship between the human and the natural, but, as I will argue via an analysis of the conceptualization of urban form in Huidobro's poetic work, this collapse of organicism does not necessitate an anti-environmentalist framework. Indeed, Huidobro's poetics demonstrate the collapse of organicism and an attempt to create a new, non-organic nature.

This article proceeds through five sections and a conclusion using qualitative methods from literary studies. Beginning with an examination of the broader context of Huidobro's relationship with the artistic movement of cubism, the first section argues that Huidobro's transatlantic poetics demonstrate a non-organic vitalism in which his works are conceived as non-organic living creations. The rest of the article investigates the consequences of this non-organic vitalism for urban design. Through a reading of his 1918 poem, *Ecuatorial*, I argue that Huidobro positions the modern poet as an omnipotent figure who authoritatively reorganizes the earth as a *non-organic, planetary*

1 This interpretation of Huidobro as anti-environmentalist can be found in Binns (2004). Travis (2010) critiques this common interpretation by arguing that Huidobro's work actually seeks to integrate with nature.

urban space. In the two following sections, I posit that Huidobro takes this new planetary urbanization as an opportunity *to create a new, non-organic earth,* a perception mirrored in some current discussions surrounding the Anthropocene. I then conclude by noting how Huidobro's poetics thereby provide a planetary-scale conceptual framework in which one can understand current urban design movements like Landscape Urbanism that seek to produce a *non-organic sustainability.* In sum, this work argues that Huidobro's non-organic vitalism provides a conceptual foundation on which one can imagine an environmentally-friendly urban design in the era of planetary urbanization and the Anthropocene.

2. CUBISM, NON-ORGANICITY, AND VITALISM

Vicente Huidobro's poetics have traditionally been interpreted as a type of literary cubism.[2] Most significantly, the cubists Guillaume Apollinaire, Juan Gris, Pablo Picasso, and Pierre Reverdy all had a profound effect on Huidobro's writing. For instance, Pierre Reverdy writes that art, "arrives, without copying anything, without imitating anything, to create a work of art for itself. Such work ought to have its own reality, its own aesthetics, its independent life, and will not evoke anything distinct from itself" (Reverdy according to Benko 1993, 42), a statement similar to Huidobro's own, "The poet creates outside of the world that exists that which ought to exist. I have a right to want to see a flower that walks or a flock of sheep crossing a rainbow" (Huidobro 1963, 654). The similarities between Reverdy and Huidobro eventually led to the infamous Huidobro-Reverdy feud in which many claimed that Huidobro in fact robbed Reverdy of his ideas (Bajarlía 1964)! Furthermore, Huidobro's initial attempts to write in French were heavily edited by Juan Gris; some manuscripts of poems from Huidobro's *Horizon carré* are written entirely by Gris (de Costa 1984, 41-6); and the creative process Huidobro outlines in his manifesto, *La pura creación,* is eerily similar to the process in Gris's lecture, "On the Possibilities of Painting." It is probable that Huidobro received ideas from Apollinaire, as well. In his *The Cubist Painters,* Apollinaire says that Orphic Cubism "is the art of painting new compositions with elements not taken from reality as it is seen, but entirely created by the artist and invested by him with a powerful reality" (Apollinaire 2004/1913, 26), and he compares artists with

2 He is even included in a 1995 anthology of cubist poets, *The Cubist Poets in Paris,* and has an entire chapter dedicated to him in a collection of essays on cubism (Carmona 2012)

God, "every divinity creates in its own image; so it is with painters" (Apollinaire 2004/1913, 9), foreshadowing Huidobro's famous line. That Huidobro's close relationship with the cubists had a tremendous effect on his writing is without question.

Peter Bürger (1984) has interpreted the cubist movement in terms of its attack on *organicism*. According to Bürger, within the organic work of art each individual element of the work is subordinated to an overarching organizing principle, thereby imitating a perceived organicism in the natural world. As such, an organic work can be defined as a system of interdependent parts that emphasizes the function of each element within a larger body; each 'organ' only functions so long as it is connected to the broader 'organism.' The cubist work of art, however, upends this organic order, fragments so-called natural organic reality, and subsequently permits each individual element to be thought of as standing on its own (Bürger 2009/1974, 90). For instance, the cubist technique of montage, in which, to refer to one example, the artist takes a piece of newspaper and sticks it on a painting, "presupposes the fragmentation of [organic] reality" (Bürger 2009/1974, 73-4). As a result, as Bürger argues, cubism effectively produced the possibility of the *nonorganic work of art,* in which individual elements are no longer in an integral relationship with other elements and there is no overarching organic whole under which those elements are subsumed – the unity produced by the cubist work of art is a consequence of individualized relationships between particular elements. Huidobro's poetics, operating within the world of cubism, should therefore be expected to demonstrate some manner of non-organicity.

As recent scholarship has argued, however, Huidobro's poetics are marked by a *transatlanticism*, in which Latin American poetry, especially that of *modernismo*, had a profound influence on his work in addition to cubism (Infante 2003). In other words, to call Huidobro a literary cubist ignores his engagement with Latin American poetics separate from cubism. For instance, claims that Huidobro's ideas of poetry as creation came from Reverdy or Apollinaire miss that one of Huidobro's most famous explanations of *Creacionismo*, "the first condition of the poet is to create; the second, to create; and the third, to create" (Huidobro 1963, 673), comes directly from the *modernista* poet, Rubén Darío, who, speaking about poetry in "Palabras Liminares" of *Prosas Profanas*, says, "And the first law, creator: create" (Darío 1990, 12). Indeed, Huidobro explicitly cites the poetic ideas of an author from the United States, Ralph Waldo Emerson, as a precursor to *creacionismo*. Huidobro's poetry, while clearly engaging cubist practices, is marked by a transatlanticism.

The divergence of Huidobro's poetics from a strict cubism is noticeable in the former's vitalism. Seemingly providing support to Buell's broad critique of avant-garde and modernist anti-environmentalism, Bürger claims that as a result of their non-organicity avant-garde works of art replace *living elements* with *non-living material,* "Artists who produce an organic work (in what follows, we shall refer to them as 'classicists' without meaning to introduce a specific concept of what the classical work may be) treat their material as something living…For avant-gardistes [like the cubists], on the other hand, material is just that, material. Their activity initially consists in nothing other than in killing the 'life' of the material" (Bürger 2009/1974, 70). As he summarizes, "The classicist produces work with the intent of giving a living picture of the totality…The avant-gardiste, on the other hand, joins fragments with the intent of positing meaning…The work is no longer created as an organic whole but put together from fragments" (Bürger 2009/1974, 70). Bürger argues that the concept of 'life' disappears in the cubist work as a result of its engagement with non-organicism. The poetry of Vicente Huidobro, however, seems to conceive of a *non-organic vitalism*, in contrast to Bürger's insistence that cubist non-organicity is exclusive of 'life.' For instance, Huidobro says about technological inventions in a manifesto, "Man has invented a whole new wildlife that walks, flies, and fills the earth, space, and seas with its wildness, its screams, and its howls" (Huidobro 1963, 673). In this statement, he re-imagines non-organic technological inventions like airplanes as *living* creatures. In contrast to Bürger's discussion of cubism, Huidobro insists that one can put together a work from material and mechanical fragments in such a way that it produces something living. This is observable in the very conceptual basis of *creacionismo:* the poet *creates* something, they do not make or produce it. By conceptualizing the work of art or poetry as creating something like a god creates animals and plants, as he implies in his famous description of the poet as a small god, Huidobro introduces a vitalism to cubism's non-organicism.

Indeed, Huidobro's non-organic order is filled with life. For example, let us look at an image from his 1918 poem *Ecuatorial*: an airplane is a mechanical nightingale (Huidobro 1981, 41). Ecocritical perspectives will rush to the conclusion that Huidobro mechanizes nature and strips it of its vitality by equating a nightingale with an airplane. This is a misinterpretation. Instead of claiming "a nightingale is an airplane," Huidobro's metaphor posits the converse, "an airplane is a nightingale." He does not mechanize nature, he *natures the mechanical.* It is not that the natural world is perceived as a non-organic, dead machine; the non-organic machine is viewed as a second nature. In other words, the absence

of organicism does not necessitate an antipathy towards nature or life; in the case of Huidobro, his non-organic poetics are used to create a *new life* out of material fragments. This begs the question: What are the spatial consequences of this non-organic vitalism and what is its significance for urban design?

3. HUIDOBRO AND THE ANTI-ENVIRONMENT

Huidobro's engagement with non-organicism on a spatial level is demonstrated in his 1918 poem dedicated to Pablo Picasso, *Ecuatorial*. In this poem, Huidobro celebrates the disappearance of the organic, natural world through the global expansion of urbanization as an opportunity for the poet to rearrange planetary space non-organically. Written in Madrid at the end of World War I, the poem heralds the breaking apart and destabilization of a world's symbolic space, spatial configurations, and poetic forms and arranges these fragments into a new, non-organic order. The poem announces the apocalypse – its last line is, "The End of the World" (Huidobro 1981, 43) – and subsequently creates a new world (Goic 1999). At the poem's close, we read: "ALPHA / OMEGA / FLOOD / RAINBOW / How many times will life have begun again / Who will tell everything that has happened on a star / Let's be on our way / Taking the ripe head in our hands / THE MECHANICAL NIGHTINGALE HAS SUNG" (Huidobro 1981, 41). These lines refer to the collapse of the Biblical symbolic world and the natural world. First, Huidobro ties his apocalyptic vision to the Biblical universe by referencing both Revelations 1:8 – "I am Alpha and Omega, the beginning and the ending, saith the Lord, which is, and which was, and which is to come, the Almighty" – and the story of Noah's flood in the line, "Alpha/Omega/Flood/Rainbow." The Biblical end(s) of the world are explicitly declared through these allusions. Second, he de-organicizes the nightingale – the formerly natural organism has been transformed into a machine. Contained in this passage is a double apocalypse: the end of both the Biblical and the natural universes.

The apocalypse of Biblical and natural symbolic spaces, however, is not equivalent to their disappearance. Instead, these universes dissolve into their component parts and are reordered within a humanized and non-organic world. *Ecuatorial* is marked by *liquidation* and *renovation* of the natural and organic world, not by its vanishing (Goic 1999, 10). For instance, in the phrase, "The divine aeroplane / Brought an olive branch in its hands" (Huidobro 1981, 27), an airplane replaces the dove as the symbol of the end of Noah's flood. The Biblical symbolic universe, in

which organic creatures are created by God – e.g., a dove or nightingale, is deconstructed and re-ordered in a symbolic universe of technology, in which mechanical creatures are created by humans – e.g., an airplane. In *Ecuatorial,* the apocalypse breaks apart the symbolic universes of the Bible and nature so that their components can be re-used by poets within a human-dominated, technological epoch; the dissolution of a first, organic world is perceived as an opportunity to create a new, non-organic one. This process of liquidation and renovation is embodied in the form of the poem. Huidobro eschews punctuation as well as standard page formatting, capitalization, rhyme, and meter, but does not abandon the poetic process of ordering words into a work – he abandons ordering them into an *organic* work. Huidobro does not dissolve the concept of the work of art, he reconceptualizes it without depending on organicism. This fragmenting and rearranging of wholes characterizes the poetics of *Ecuatorial*.

This absence of organicism is revealed in *Ecuatorial's* basic spatial configurations. The places represented in the poem - Alaska, London, Paris, the Congo, Norway, California, Niagra Falls, the Andes, and Switzerland - are well-known, but their spatial organization is bewildering. In the course of 12 lines, the narrator moves from the American arctic to (in the very next line) the Congo, then to Western Europe, to Norway, and finally to the Atlantic (Huidobro 1981, 29). Organic cartography focused on local distinguishing features - one place moving continuously into another, with each site taking part in the whole - has been replaced by a fragmented map that is global in its scope. Furthermore, this new spatial order is marked by a planetary urbanization defined by natural landscapes being transformed into and juxtaposed next to built environments and tied together by new machines of communication: the telegraph, the telephone, and the railroad (Miranda Herrera 2012, 114). *Ecuatorial* demonstrates the dissolution of an organic universe and the emergence of a fragmented, urbanizing globe stitched together non-organically.

This production of a non-organic, urban spatial order runs into a problem of *legitimation.* In other words, it is unclear why this new planetary urban order should be viewed as legitimate by its inhabitants, why they should have confidence in Huidobro's capabilities to maintain effective urban structures. Huidobro's legitimizing force for his non-organic urban-space is the dominant authority of the poet-god. In a 1924 manifesto, he writes: "The poet takes us by the hand to drive us beyond the final horizon, beyond the point of the pyramid...There he has planted the tree of his eyes and from there contemplates the world, from there he speaks to us and discovers for us the secrets of the world" (Huidobro

1963, 656). The space *beyond* is accessed thanks to poets' ability to "drive us beyond the final horizon." Without this demi-divine power to communicate this space's secrets and to bring 'us' mortal non-poets to the beyond, no new order would emerge: there would simply be collapse. It is within this context that Huidobro confidently claims, "A poet must say those things that would never be said without him" (Huidobro 1963, 674). Huidobro's order is legitimized through the omnipotence of the sovereign and authoritarian poet. A problematic authoritarian politics underlies Huidobro's legitimation of his non-organic spatial order.

4. RETHINKING ENVIRONMENTAL URBANISM NON-ORGANICALLY

This authoritarian legitimizing power of the poet in regards to the creation of a non-organic order becomes violent in regards to nature. In a 1941 interview, Huidobro says:

"...the only true contact of man with nature is the contact of fighting with her and of dominating her...The true contact is the creator-contact, it is that of the man that passionately assaults the bowels of the earth and takes tons of foreign materials and fabricates a new monster...The true contact is that of the poet or artist that shouts at nature with his large voice of a rebel angel: Non serviam. No, no I will not serve you. You will serve me." (Costa 1975, 94).

Here, the interweaving of power and violence in the poet's creative voice is laid bare. Huidobro creates a non-organic, living entity from fragments - he fabricates a 'new monster' - yet this is done through the authoritarian voice of the poet or artist who violently dominates a feminine nature - the 'raw materials' of creation are not simply appropriated, they are *taken* in an assault of the bowels of the earth. Ecocriticism's prediction that a non-organic view of nature will lead to its exploitation and destruction, as well as to women's oppression, seems to be carried out in full.[3]

Despite his violent statement above and despite his celebration of technology, Huidobro's antagonism towards nature is not entirely clear. Indeed, Huidobro's theoretical treatises are strangely filled with reverence towards nature. In his manifesto, *Non Serviam*, where he claims, "I will

3 The broader relationship between violence towards nature, the celebration of non-organicism, and violence towards women is outlined by Carolyn Merchant (1980).

not be your slave, mother Nature; I will be your master," he also states, "Goodbye, mother, I do not disown or curse you for the years of slavery at your service. They were the most precious teacher" (Huidobro 1963, 654); and, as we have already seen, he compares technological inventions to "a whole new wildlife" and calls an airplane a "mechanical nightingale." Indeed, as was already argued in relation to the final example, Huidobro is effectively re-framing mechanical production as the creation of a *second nature.* Although Huidobro attacks the first nature and its living creatures created by the Biblical God or embodied in the concept of 'mother Earth,' he does not attack nature or life in general. Instead, Huidobro reconceptualizes this liquidation of the first nature and its living beings as a renovative opportunity for a poet to create new, non-organic nature and living beings. In regards to Huidobro's *non-organic, planetary urban space,* then, the urbanization of the planet opens up the opportunity for the poet to create *a new, non-organic earth.*

To arrive at this final conclusion – *Ecuatorial*'s demonstration of a fragmented global urban space may be better understood as the creation of a new, non-organic earth – let us first discuss the transatlantic context in which Huidobro was operating when he wrote *Ecuatorial*, for although Huidobro wrote this poem while in Madrid, his poetics are formed by an attempt to put Chile in relation with his experiences in Europe (Infante 2003). This transatlanticism would not have been novel for Huidobro in 1918, given that his childhood home of Santiago was formed via Chile's earlier engagement with Europe: much of Santiago was rebuilt in the 1870s based upon the ideas of Georges-Eugène Haussmann, who had re-designed Paris (Errázuriz 2003, 188); the glass ceiling of the Museo Nacional de Bellas Artes was built in Belgium in 1907, brought to Chile, and then the museum was erected in 1910 according to the French Art Nouveau style and using European construction techniques developed in the nineteenth century; and modern French dress had almost completely replaced the traditional garments inherited from Spain. One Edmond Cotteau even commented about Chile, "Everything is developed as if it were France" (Errázuriz 2003, 182). Moreover, Chile's landscape had been transformed by the arrival of communication and transportation infrastructure - telegraphs, railroads, bridges, etc. - from Europe and financed by Britain. In other words, modernity arrived from Europe for Chile. This had created a semi-colonial situation, in which the country was heavily dependent upon the British Empire: by 1890, three years before Huidobro's birth, England had absorbed 70% of Chilean exports and covered 45% of its imports (Vitale 2011, 313). The sprawl of urbanization was simultaneously transforming the Chilean landscape and experienced

as a European phenomenon coming to Latin America.

Huidobro's poetics, by nurturing a *desire* for modernity, to rephrase Mariano Siskind (2014), functionally repurpose this infrastructure of semi-colonialism. In other words, experiencing urban sprawl's infrastructure as the arrival of a desired modernity, rather than as tools of semi-colonial domination, Huidobro appropriates its elements as modern instruments to create a new earth. For instance, he describes a locomotive as a "cigar of the horizon / dancing between the trees" (Huidobro 1981, 27). In this image, the train and its attendant infrastructure transform the earth into something new, altering the image of the horizon and the layout of the forest. Furthermore, Huidobro non-organically reorders global space with precisely this new mode of train transport. For instance, Huidobro writes, "The Andes / Fast as a convoy / Cross Latin America," and five lines later, "One morning / Alpinist shepherds / Played violin about [sobre] Switzerland" (Huidobro 1963, 301). In this passage, Huidobro juxtaposes the mountain ranges of Latin America and Switzerland via the convoy of the Andes, which travel throughout the continent and connect distant places through their movement. Huidobro makes the train's role in reordering global space as a non-organic, urbanized planet clear, "The train is a piece of the city that moves away" (Huidobro 1963, 300). It is precisely modern transportation, provided via British semi-colonial control over Chile and repurposed by Huidobro, that provides the means for the poet to create a new non-organic global space.

If *Ecuatorial*'s new, non-organic, urbanized globe created by the sprawl of infrastructure appears to be post-catastrophic, one must remember that for Huidobro mechanical production also presents the opportunity to create a new natural object, which, in this case of covering a planet with urban infrastructure, would entail the creation of a new earth. Indeed, immediately after Huidobro presents a landscape destroyed by World War I, he writes: "Above the rainbow / a bird was singing" (Huidobro 1981, 25). Here he makes reference to the promise made after Noah's Flood which repeatedly appears in *Ecuatorial*: the earth, now destroyed, will never be destroyed again, and from its ashes can emerge a new earth. If Huidobro closes *Ecuatorial* with a trumpet call announcing the "End of the Universe," then buried in this end is the expectation that a new earth will subsequently emerge, just as a new "mechanical nightingale" emerged after the death of the organic nightingale. The destruction of the first, organic earth via urbanization raises the opportunity for that urban sprawl to be repurposed for new ends: the creation of a second earth.

This idea of a 'second earth' can be elucidated through a reading

of Karl Korsch's comment that with Marx, "'pure' nature which is presupposed to all human activity (the economic *natura naturans* [sic]) is replaced everywhere by a 'nature' mediated and modified through human social activity, and thus at the same time capable of a further change and modification by our own present and future activity, i.e., by nature as *material production* (or the economic *natura naturata* [sic])" (Korsch 1938). At a first glance, this appears to re-emphasize the basic narrative that prior to modernity humans acted in relation to a 'pure,' organic nature, which is later swallowed up and consumed by non-organic, material production in the Industrial Revolution. Huidobro's challenge, however, is the following: How can this material production be natured? How can one *nature the urbanized globe* as Huidobro *natured the airplane*? How can one repurpose modern infrastructure, which has simultaneously destroyed the 'first earth' and non-organically linked together the planet, for the creation of a new earth? Huidobro eschews a traditional environmentalist paradigm in which one recovers organicism by wresting organic bits from the mechanical world and nurturing these natural preserves; instead, he attempts to *nature* the urbanized world by re-imagining material production as the creation of a new, non-organic nature following the destruction of God's Biblical nature.

5. HUIDOBRO IN THE ANTHROPOCENE

Pushing this argument farther, Huidobro is prefiguring the Anthropocenic discourse of geoengineering. Paul J. Crutzen's definition of the Anthropocene is by now well-known: "the effects of humans on the global environment have escalated. Because of...anthropogenic emissions of carbon dioxide, global climate may depart significantly from natural behaviour for many millennia to come. It seems appropriate to assign the term 'Anthropocene' to the present, in many ways human-dominated, geological epoch, supplementing the Holocene" (Crutzen 2002, 23). With the concept of the Anthropocene, Crutzen points to the subsumption of the natural domain within the human, as Korsch did in terms of material production. Conceiving human activity as existing in one world, and the natural world in another is bankrupt. In the Anthropocene, nature becomes *societalized* (Beck 2012/1986, 80). If this is the case, then the traditional environmentalist program of preserving nature no longer functions, since there is no longer a 'pure' natural world to be preserved. One way to address environmentalism after the collapse of the program of preservation, then, is to *create a new nature.*

This is by no means a novel thesis. The urban environment has long been discussed in terms of being a 'second nature,' and it has recently become cliché to identify this 'second nature' as both the cause of (and cure for) the Anthropocene (Ruddick 2015, 1115). Indeed, a technostructure composed of roads, railways, mines, pipelines, power lines, container ships, and financial centers, all composing what has been described as a 'second nature,' has swung the Earth's biosystems into the Anthropocene (Bonneuil and Fressoz 2016, 222). Previously this urban form was rather limited in its scope and effect; however, the development of this technostructure has given rise to *planetary urbanization* today, completely upending our previous conceptualizations of land use in terms of urban, suburban, and rural (Brenner and Schmid 2011). Whereas previous processes of urbanization allowed for, or rather produced, a clean distinction between 'wilderness,' rural areas, and cities, today nature is entered into urbanization as a whole. As Korsch notes, primary nature has entered into material production; there is no outside to the urban world (Brenner and Schmid 2014). In other words, "the loss of a precise urban form, an urban, a planetary urban, apparently so pervasive in its spread over the globe that what was once thought of as its constitutive outside is swallowed up in a relentless advance" (Ruddick 2015, 1117) – all of the earth is urbanized to some degree (Soja and Kanai 2007, 62). The process of planetary urbanization speaks to the incorporation of nature into a global urban form (Lefebvre 1991/1974, 229). A question thus confronting urban designers today is whether this planetary urbanization can be restructured into a *second earth* following the consumption of 'mother nature.'

The production and design of a second earth has been theorized within scientific discourse under the concept of geoengineering, the basic argument for which is outlined by Mark Lynas, "…playing God (in the sense of being intelligent designers) at a planetary level is essential if creation is not to be irreparably damaged or even destroyed by humans unwittingly deploying our newfound powers in disastrous ways," and, he adds, "the objectors [to geoengineering] seem to forget that we are already carrying out massive geoengineering every day, as a hundred million people step into their cars, a billion farmers dig their plows into the soil, and 10 million fishermen cast their nets" (Lynas 2011, 10-11). According to Lynas, the only way it is possible to save the earth is by "playing God" (Lynas 2011, 10) a phrase we have already encountered in Huidobro. Furthermore, to critique such activity as hubristic is to ignore that this activity is already happening. For Lynas, the question is not whether or not we should geoengineer, the question is whether we are in control of

such godly creation or not. God's earth is no more – the earth is now the creation of human 'small gods.' In the words of Stewart Brand, "We are as gods and might as well get used to it" (Brand 1968, 3). The geoengineering thesis is simple: humans are drastically transforming the environment, it is time we get in control of such power. Combined with the analysis of planetary urbanization above, we can posit the following: the Anthropocene is the (conscious or otherwise) creation of a *second, urbanized earth.*

Ecuatorial presents just such a creation of a geoengineered technostructure turned into a second earth. The poem opens with the collapse of the Biblical God's earth at the hands of urbanization, but Huidobro insists in his manifestos that the poet's goal is simple: to dispose of 'mother nature' and to *create* a new, second nature from the fragments of the destroyed first nature.[4] For Huidobro, then, the destruction of the global landscape presents an opportunity for *creation*. As such, he provides a means by which one can conceptualize planetary urbanization within an environmentalist framework. Developing Huidobro's thought, the Anthropocene becomes intimately linked to an urban design reconceptualized as *planetary creation*. Geoengineers and contemporary environmentalists have struggled with just this need to reconceptualize the new relationship between the human and the 'natural' in an era in which it appears that everything has been affected by human activity. While the term, 'the Anthropocene,' has emerged to replace the concept of 'the environment' (Purdy 2015, 4), for instance, little has been done to re-examine the concepts of *landscape, city*, and *development* which no longer function in the era of planetary urbanization (Brenner and Schmid 2014). Huidobro's poetics, as demonstrated in *Ecuatorial*, provide a way to conceptualize a created earth of the Anthropocene (in contrast to a *preserved* earth).

This re-conceptualization of geoengineering in the Anthropocene as the creation of a second earth is not without its problems. Three issues specifically underlie geoengineering and Huidobro's planetary creation. First is the question of the *feasibility* and *viability* of geoengineering. It has been repeatedly pointed out that many suggestions by geoengineers likely would not work, would exacerbate other problems, or would potentially have unintended consequences (Klein 2014, 256-289; Robock 2008). Second, there are the problematic politics of geoengineering already discussed in relation to Huidobro above. The violence towards nature

4 See Vicente Huidobro's manifestos, "Non Serviam" and "Creación pura."

and the image of the creator as omnipotent God sets up an authoritarian political system in which inhabitants of the second earth are subjected to the dictates of the creators (Bonneuil and Fressoz 2016, 80-93, Dryzek 2013, 25-72). Third, one might argue that my discussion of Huidobro's theory of creation merely acts as an ideological veil for the continued exploitation of the natural world. Huidobro is by no means the first to compare technological development with natural creation. For instance, Marc-Antoine Laugier compared a city to a forest in 1753. Yet, as Manfredo Tafuri points out, Laugier's naturing of the city served to mystify its function as a structure that transforms and exploits the processes of water, soil, life, and air (Tafuri 1976, 6-7). The ecologically devastating effects of building a city were masked by calling it 'natural.' Similarly, one can easily argue that Huidobro's second earth merely mystifies the exploitative and destructive practices of geoengineering and British semi-colonialism. Furthermore, one cannot avoid the correspondence between Huidobro's desire to "make it new" and the increase in commodity production that characterized the 19th and early 20th centuries. Indeed, much has been made of the connection between both the avant-gardes' and commodity economies' focus on producing the 'newest' good (Adorno 1997/1970). Commodity production's emphasis on *newness*, however, hollowed out the value systems formerly tied to labor, leading to discussions of the end of the 'aura,' the destruction of 'tradition,' and the need to construct new ideological legitimations of production (Adorno 1997/1970, Benjamin 2007). A convincing argument can be built showing that Huidobro replacing the concept of *production* with that of *creation* simply provides an ideological legitimation for a commodity economy - workers are not producing a commodity, they are creating a new life! One must ask: Is a theory of non-organic life only a cover for a non-organic order's evisceration of life?

The first two hesitations – the scientific viability and the political problems – are largely outside the scope of this article; however, the final *ideological* challenge needs to be examined further. To critique the concept of a 'second earth' as purely mystifying fails to view it dialectically. On the one hand, the concept may function as an ideological veil by which the exploitation of natural resources for the purposes of capital accumulation can justify itself. On the other hand, such a reconfiguration of urbanization and our relationship to the 'natural' world could just as easily require the complete reconstruction of the global economic, political, and cultural landscape. That is, to re-conceptualize urbanization as the creation of a second earth is to demand that the new categorical imperative of human activity is to produce a *creative* environment. While the conceptualization

of a 'second earth' as a means of discussing geoengineering should be viewed with caution, it also presents an avenue by which one can completely re-orient the ongoing Anthropocenic process of planetary urbanization.

6. URBAN DESIGN AND NON-ORGANIC CREATION

To further investigate what 'producing a creative environment' signifies, let us look at the practice of maintaining trees in an urban context. As Anne Whiston Spirn points out in *The Granite Garden*, "A city street does not provide the space, nutrients, or water that a tree needs in order to grow. It is an environment hostile to life" (1984, 175). In short, the contemporary city is a *non-creative* environment: it is hostile to the process of creating new life. An easy response is that Huidobro is talking about the creation of new buildings, technologies, and machines –not raising plants and animals. Yet look at the last line of the first canto of his epic poem, *Altazor,* "Silence / One hears the pulse of the world as pale as ever / The earth just gave birth to a tree" (1963, 385). Huidobro's example of creation is the birth of a tree. It is Whiston Spirn's point that nature must be *created* in the city just as it is in *Altazor* and as it was, for example, in Boston's Riverway and Fens by Frederick Law Olmsted. The question becomes: how can we build a city that nurtures creation? If the creation of a building kills trees, plants, animals, etc., is it still creative? Huidobro provides a poetic language with which we can conceptualize a new *creative* urbanization.

The ideas of landscape architecture outlined by Whiston Spirn above, however, are based on a distinction between natural processes and city form which no longer holds in the Anthropocene or in Huidobro's poetics.[5] That is, traditional 'environmental' design is based off of an idea of organicism – making the city and nature work together harmoniously as a unified organism – and a distinction between city and nature which is bankrupt today (Waldheim 2002). Following the delegitimation of this type of landscape architecture, it may be helpful to introduce a sustainable non-organicity to urban design. Rem Koolhaas already noted a tendency towards such an urban design in his 1978 book *Delirious New York*. Here, the skyscraper is described as a collection of disconnected floors of which nature composed one:

5 The ideas of Landscape Architecture which are based off of such a distinction are most clearly elucidated in McHarg (1969), subsequently developed by Whiston Spirn (1984, 1998) as well as Hough (1984).

"The interior golf course is at the same time obliteration and preservation: having been extirpated by the Metropolis, nature is now resurrected inside the Skyscraper as merely one of its infinite layers, a technical service that sustains and refreshes the Metropolitanites in their exhausting existence.The Skyscraper has transformed Nature into Super-Nature" (Koolhaas 1994, 157).

Koolhaas would himself utilize non-organicity in his 1982 proposal for Parc de La Villette in Paris. In this design, he drew parallel strips of 'natural' activity immediately next to each other, thereby de-organicizing the green space. Charles Waldheim recognized in this plan a new mode of re-organizing nature, "Koolhaas's organizational conceit of parallel strips of landscape, now something of a canonical cliché, radically juxtaposed irreconcilable contents" (Waldheim 2016, 16-7). Koolhaas plans a non-organic landscape describable as a second nature.

Waldheim and other designers have developed this idea into a school of thought known as Landscape Urbanism, which has emerged in the past 30 years in an attempt to maintain landscape architecture's focus on process and structure (in contrast to surface, shape, or form) while also recognizing that the cultural image of nature to which landscape architecture is attached is now bankrupt (Corner 1999, Corner 2006). In short, Landscape Urbanism asks: what becomes of environmentally conscious design without a nature-city opposition? The High Line by James Corner Field Operations in collaboration with Diller Scofidio + Renfro, and Piet Oudolf is the most famous example of Landscape Urbanism in the United States. Here, 23 blocks of abandoned elevated railway are reclaimed as a public space in the middle of New York City. A post-industrial landscape surrounded by an aura of decay, collapse, and environmental degradation was transformed into a popular, lively, and overall sustainable project (Fehrenbacher 2014). Indeed, Landscape Urbanists aim to restore post-industrial sites and brownfields by stitching together infrastructure into urban fabrics (Waldheim 2016 9, 19). Just as Huidobro re-formed the urbanized globe into a new earth, Landscape Urbanism seeks to re-form industrial waste sites into sustainable landscapes. Some contemporary urban design is attempting to produce *non-organic, creative landscapes.*

Nonetheless, this practice largely lacks a language adequate for its conceptualization. While Landscape Urbanists have re-theorized the concept of *landscape* in order to fit many of their needs (Corner 1999), within the discourse of urban design there is largely lacking a means by which one can discuss a global space of urbanization that no longer abides by former distinctions of city, suburb, farmland, and wilderness.

Indeed, it has been argued that urbanization in general needs a new vocabulary as a result of planetary urbanization (Brenner and Schmid 2014, 751). It has been my argument that Vicente Huidobro provides just such a language; however, this language is plagued by its relationship to violence (especially towards women), authoritarianism, and a commodity economy.

In re-thinking urbanization under the umbrella of *creative, non-organic sustainability* and *non-organic vitalism*, however, the relationship to a commodity economy via substituting *creation* for *production* becomes particularly problematic. As a consequence of this conceptual reframing, the figure of labor and the field of political economy disappear from the processes of urbanization. This absence of labor becomes especially noticeable in relation to the High Line and Landscape Urbanism. As one group of scholars have argued:

"The primary goal [of the High Line] was to remake the rail as 'public'...[in order to] increase private capital. This process has resulted in a space owned by a public agency but managed by a private entity. But the 'public' here was overwhelmingly composed of a circumscribed group of residents who secure the area's property value: wealthy property owners with interests far afield from those of the area's working-class tenants, homeless youth and pensioners" (Cataldi et al 2012, 377).

As a result, although the High Line Park is situated on a working landscape - formerly a railway supporting industrial labor, today it is the most highly staffed park per acre in NYC (Patrick 2014, 927-8) - the images of the site routinely downplay the role of labor in favor of emphasizing its role as a regenerated landscape (Cataldi et al 2012, 368). This should come as no surprise considering that by 1999, the year that community efforts were organized to redesign the High Line, household income in the two neighborhoods near Highline Park "was over 161.9% of the average for NYC and 147.6% of the average for the country" (Cataldi et al 2012, 376). By reframing urbanization and the regeneration of brownfields, post-industrial sites, cityspaces, etc. as the creation of a new earth, one elides the problem of production and the question of political economy in favor of the inspiring creative power of the semi-divine designer and poet.

7. CONCLUSION

This article has primarily claimed that Vicente Huidobro's poetics, as demonstrated in *Ecuatorial*, provide an environmentalist framework within which we can begin to discuss the global, non-organic, urban form of the Anthropocene. That is, confronted with the need to imagine a new earth created under the threat of planetary destruction (Madden 2012), Huidobro posits a basic poetic solution characterized by a *non-organic vitalism,* which translates into a *non-organic sustainability* in terms of urban design. Vicente Huidobro's poetry thereby provides a conceptual framework for an urban environmentalism understood in terms of *creation:* planetary urbanization as the creation of a new earth. As I also showed, this framework has serious drawbacks: it is rooted in semi-colonialism and violence in addition to possibly justifying authoritarianism and economic exploitation. The question Huidobro poses is whether this framework can be appropriated while leaving these problems behind. In short, I have accepted the de-organicization of urban form and the earth rather than resisting it. Environmental urbanism in the Anthropocene thus takes on a new *creative* form in contrast to its previous *preservationism.*

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CONTRIBUTORS

ALIA'A K. AMR is a Jordanian architect and doctoral student at Tampere University of Technology in Finland. Her research interests are in urban planning, urban policies and sustainable city growth.

ANTONIO DI CAMPLI is an Italian architect and PhD. He is also a researcher at Pontifical Xaverian University in Bogotá, Colombia. His research interests lie at the intersection of urban design, social sciences and landscape theories. His three main research fields are 1) relationships between urban design strategies and landscape design theories, 2) reconstruction of genealogies of the 'postmodern turn' in the practices of urban design and 3) interior urbanism techniques and discourses.

MINNA CHUDOBA is a University Lecturer at the School of Architecture, Tampere University of Technology. Her interests are focused on the history of urban planning, urban planning theory, urban morphology and architectural pedagogy.

PHOEBE CRISMAN is a Professor of Architecture and Director of the Global Environments + Sustainability major at the University of Virginia, USA. She investigates intertwined socio-economic revitalization, environmental restoration, and adaptive strategies to create more resilient and just coastal communities. Educated at Harvard and Carnegie Mellon Universities, she practices with Crisman+Petrus Architects. She has received over 30 major awards, and her writings are published in several journals and books.

JORGE LEÓN C. is a PhD and Assistant Professor in Urban Design Studio in the Department of Architecture in Universidad Técnica Federico Santa María (USM), Valparaíso, Chile. He is also a researcher at the National Research Center for Integrated Natural Disaster Management (CIGIDEN). His research focuses on the role of urban forms in supporting populations' responses during rapid-onset emergencies such as earthquakes, tsunamis and wildfires. He has developed a multidisciplinary study framework with urban design principles for enhancing communities' resilience to nature-originated hazards.

ELISA LÄHDE is a landscape architect and doctoral student in Aalto University, Finland. Her research interests include green infrastructure, landscape design and climate adaptation. In her doctoral research she wants to develop new approaches to integrate hydrological and natural processes into urban design. In addition to research work Elisa is actively

teaching, lecturing and doing practice-oriented design work to develop new green infrastructure solutions for real-life needs

ELNAZ NASERI has graduated as Master in Urban and Regional Planning from Allameh Tabatabaie University, Tehran, Iran. She is currently a junior urban planner in the urban department of Negin Shahr Ayandeh Consulting Engineers. She is interested in both working and researching in urban issues, especially in urban regeneration.

JUHO RAJANIEMI is a Professor of Urban Planning at the School of Architecture, Tampere University of Technology. He has specialized in the Finnish zoning system and its connections to urban growth and decline. He is also interested in urban planning related health, power and governance issues, as well as urban utopias and dystopias in literature. Rajaniemi was the President of Re-City 2015 and Re-City 2017 congresses.

KAJSA ROSQVIST is a project manager at the City of Helsinki Environment Services. She has a PhD in Marine Biology (Åbo Akademi University) and her research interests relate to the role of vegetation in drainage systems and coastal water bodies. Rosqvist has during recent years been leading several international cross-sectoral water protection projects aiming for increased storm water and waste water quality as well as urban climate change adaptation in municipalities.

BEHROUZ SAFARI is a Master in Sociology from Bu-Ali Sina University, Hamedan, Iran. He has participated as an urban sociologist in several projects in Tehran, especially in the field of urban renovation. His research interests are social stratification, social policy, urban poverty, informal settlement and deteriorated urban fabrics as well as comparative urban research. Currently, he is a student of the Master 2 Urbanisme et aménagement at the University of Strasbourg, France.

MARCELA SOTO C. is a PhD working as an Assistant Professor and Urban Planning Coordinator at the Department of Architecture in the Universidad Técnica Federico Santa María (USM), Valparaíso, Chile. She has also given technical advice for the elaboration of natural risk components in the Valparaiso Regional Plan. She has been an academic representative of the USM in the Reconstruction of Valparaíso City. Her actual research focus is in the new roles of public space focused on children. To achieve this objective, her research group has developed methods based in GIS platforms and fieldwork surveys with the community.

MAXWELL WOODS is a PhD candidate in the Department of Comparative Literature and Folklore Studies at the University of Wisconsin – Madison in the United States. His work focuses on the overlap of urban design, environmental studies, and modernism and has previously appeared at Edge Effects, TELOScope, and Species and Class. Prior to going to UW-Madison, Max co-founded Orchestrating Diversity, a high-level orchestral music program for underserved youth in the St. Louis area.

(IM)POSSIBLE CITIES
Juho Rajaniemi & Minna Chudoba (editors)

The imagination-provoking theme of the second international city regeneration congress, *(Im)Possible cities*, resulted in a variety of papers, ranging from literature-inspired theoretical studies to practice-oriented reports of urban management and urban planning. The papers chosen for this publication provide a descriptive cross-section of the congress presentations. The topics deal with issues that are current in cities around the world: administrative challenges, densification and growth, urban mobility, water management, recreation and health. The diversity of the papers reflects the conference theme, although the papers tend to lean towards the possible instead of the impossible. The seven chosen articles are published under three different sections. Section one, *Parks and water as elements in urban regeneration,* deals with issues brought about by climate change: rising sea levels affecting coastal cities and urban storm water management. Section two, *Settlements, mobility and regeneration strategies*, offers a look at challenging cases of urban development around the world, in various scales. Questions of decentralisation, densification and the management of urban growth are studied with examples from Jordan, Iran, Chile and Ecuador. Section three, *Poetry and urban regeneration discourse,* links an urban studies focus with a literary focus. The last paper has a global viewpoint, and is able to traverse from one continent to another within adjoining lines of one poem, transcending time as well as place.

CONTRIBUTORS

Alia'a K. Amr
Antonio di Campli
Minna Chudoba
Phoebe Crisman
Jorge León C.
Elisa Lähde
Elnaz Naseri
Juho Rajaniemi
Kajsa Rosqvist
Behrouz Safari
Marcela Soto C.
Maxwell Woods

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